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WAR DEPARTMENT

TECHNICAL MANUAL

AIRPLANE INSPECTION GUIDE

17 August 1943



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No. TM 1-415 }

WAR DEPARTMENT,
WASHINGTON 25, D. C., 17 August 1943.

AIRPLANE INSPECTION GUIDE

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SECTION I

GENERAL

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1. **Purpose.**—The purpose of this manual is to furnish to airplane mechanics, inspectors, and other maintenance personnel, in a concise form, the necessary information relative to the inspection of airplanes, airplane engines, and auxiliary equipment. The instructions presented in subsequent sections, when supplemented by the references indicated, furnish the complete information necessary to fulfill the requirements of the various periodic inspections included in the visual inspection system for airplanes. They are written in accord with Army Air Forces Technical Orders and other authoritative publications.

* This manual supersedes TM 1-415, 7 March 1942.

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2. Scope of instructions.—Instructions cover what to inspect and when, but do not include the details of how to inspect or repair; that is, the tolerances permitted, the adjustments to be made, or the methods of performing the maintenance. When information of this nature is required, reference should be made to the Technical Orders and other publications listed in sections VI to XII, inclusive. Where Technical Orders prescribe inspections or maintenance requirements which are not listed in this manual, they should be considered additional requirements and should be performed as specified. Whenever instructions contained in the latest Technical Orders conflict with those contained in this manual or with Technical Orders of a preceding date, the latest Technical Order will take precedence.

3. Inspection record forms.—The inspection and maintenance of all airplanes in the Army Air Forces require the use of the following record forms:

a. W. D., A. A. F. Form No. 41B (Maintenance Inspection Record) (figs. 1-7) provides a certified record of all inspections and maintenance that can be readily done by supervisory maintenance personnel and unit or activity commanders. This form also provides for a record of flying time and of supplies consumed, so that one accomplished (filled-in) form gives a complete history of the operation of an airplane during the period covered. It enables inspectors, unit and station commanders, engineering officers, and other inspection personnel to determine quickly the mechanical status of an airplane and the standard of maintenance thereof; it furnishes the crew chief a suitable means of indicating and recording the results of inspection and the maintenance work performed on the airplane.

b. W. D., A. A. F. Form No. 60A (Technical Instruction Compliance Record—Airplane) (figs. 8 and 9) is employed to furnish a historical record of all *one-time* changes and inspections performed on an airplane throughout its entire service life.

c. W. D., A. A. F. Form No. 60B (Technical Instruction Compliance Record—Engine) (figs. 10 and 11) is employed to furnish a historical record of all *one-time* changes and inspections performed on an engine throughout its entire service life.

d. W. D., A. A. F. Form No. 61 (Propeller Historical Record) (figs. 12 and 13) provides a record for each controllable propeller that will show the total hours of operation, operating time since last overhaul, the number of overhauls, repairs, replacement of parts, etc.

e. W. D., A. A. F. Airplane Maintenance Instruction Forms, prepared in pamphlet form for each model of airplane, provide standard instructions for performing routine inspections of airplanes by approved methods and at proper intervals, as found by study of the best

procedure developed by mechanics and by study of mechanical failures, forced landings, and aircraft accidents. Instructions covering the use of these form are contained in TO 00-20A-2.

f. W. D., A. A. F. Form No. 1 (Airplane Flight Report—Operations) provides operations officers with a report of each flight, for use in maintaining the local records required in the preparation of training progress records, flying time by organization, personnel, equipment, missions, etc. (Detailed instructions for use of this form are contained in Army Air Forces Regulation 15-1.)

g. W. D., A. A. F. Form No. 1A (Airplane Flight Report—Engineering) conveys to the pilot, prior to flight, the essential facts regarding the condition of the airplane he is to fly, and gives the mechanics, after a flight has been completed, information regarding the performance of the airplane and the work which has been done upon it at other stations. (Detailed instructions for use of this form are contained in Army Air Forces Regulation 15-1.)

SECTION II

INSPECTION PERIODS

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4. Classification.—The periodic inspections required for all aircraft in the Army Air Forces are—

- a.* Preflight.
- b.* Afterflight.
- c.* Daily.
- d.* 25-hour.
- e.* 50-hour.
- f.* 100-hour and subsequent inspections.
- g.* Engine change.
- h.* 25 hours after engine change.
- i.* Special.

5. Preflight.—*a.* The preflight inspection is a check of the complete airplane to determine that the controls, fuel system, engine in-

struments, etc., are functioning properly; that all cowlings, fuel, oil-tank caps, etc., are in place and properly fastened or secured and that the airplane is properly serviced; that all accessible fuel strainers, including tank drains where drain cocks are provided, are drained and safetied; and that the airplane is ready for flight. This is a separate inspection from the daily inspection.

b. Prior to the first flight each day, each airplane will be given a preflight inspection and engine warm-up.

c. No airplane will remain idle more than 6 days without a preflight inspection (including engine warm-up) unless in "In Storage" status; undergoing engine change; or in the engineering shops and not being used for flight.

d. The procedure to be followed and the specific work to be accomplished in the performance of the preflight inspection are given in section V.

6. Afterflight.—*a.* The afterflight inspection is a check of the airplane to determine its general condition and to detect malfunctioning which occurred in the last flight. It also includes the servicing of the airplane.

b. The afterflight inspection is required for all aircraft after the completion of any flight.

c. The procedure to be followed and the specific work to be accomplished in the performance of the afterflight inspection are given in section V.

NOTE—In old Technical Orders the daily and afterflight inspections are not separated as is done in new Technical Orders. The afterflight inspection is not intended to replace any other periodic inspection, but to ascertain further that the airplane is a perfectly functioning unit.

7. Daily.—*a.* The daily inspection is for the purpose of determining the general condition of the complete airplane. It is designed to detect aggravated conditions, maladjustments, breaks, etc., but is not designed to be sufficiently thorough and searching to detect slight wear and early stages of deterioration.

b. A daily inspection and the necessary routine work will be performed once each calendar day, except on the following occasions:

(1) When no flights have been made since the last daily inspection, and the record shows that the last daily inspection was complete and the airplane in good mechanical condition.

(2) When the airplane is placed in "In Storage" status. This is done by a written order of a responsible officer, entered on Form 41B, across columns 48 and 49 (fig. 7) in the section headed "Status Today," and signed by such officer. "In Storage" status may include an air-

plane awaiting arrival of parts or one not required for a prolonged period. (See TO 02-1-1.)

(3) When the airplane is in the engineering shops and not being used for flights.

(4) When the airplane remains overnight at a place where no Army Air Forces enlisted or civilian mechanics are present for duty or are traveling with the airplane. In such cases, the "Exceptional Release" must be signed on the Airplane Flight Report, as directed in Army Air Forces Regulation 15-1.

c. No airplane will remain more than 6 days without a daily inspection unless in "In Storage" status, undergoing engine change, or in the engineering shops and not being used for flight.

d. When this inspection is to be performed on a complete airplane by only one or two mechanics, the various airplane parts, assemblies, and systems should be inspected as far as practicable in the order in which they are listed in section IV. If such inspection is to be made by more than one airplane mechanic or equipment specialist, under the supervision of the crew chief, the inspections grouped under any one of sections VI to XII, inclusive, may be assigned to one or more mechanics and each functional group inspected in the order listed.

e. Entries made on the Maintenance Inspection Record (Form 41B) to show the performance of the daily inspection and the status of the airplane upon completion of such inspection are made by the airplane crew chief. Entries made on the Maintenance Inspection Record to show maintenance work accomplished (completed) or maintenance work required are made by the mechanic who inspected or worked on the part, assembly, or system referred to by such entries.

8. 25-hour.—*a.* The 25-hour inspection includes the daily and pre-flight inspections, and is designed to be sufficiently thorough and searching to allow the detection of slight wear and other early stages of deterioration. The inspections required at the 25-hour inspection period and the approximate order in which they should normally be performed are given in section IV.

b. The 25-hour inspection will be performed between the 20th and 30th flying hours after the completion of the last 50-hour inspection. If the inspection has not been completed by the 25th hour, the red dash, symbol for "Required Inspection Not Made," will be placed in the appropriate columns of Form 41B until the 30th hour, when the red diagonal will be entered in the appropriate columns until the required inspection is made.

c. It is not necessary that the 25-hour inspection be performed as one continuous operation with the airplane held "out of commission" from the time inspection is started until the time the inspection is

completed. The period of 10 flying hours (20th to 30th hour) allowed for the performance of this inspection is to permit its accomplishment during the normal maintenance periods without withdrawing the airplane from regular service or placing it "out of commission" for lengthy periods. It is thus permissible to spread the inspection over a period of several days, flying the airplane each day during the normal flying period and performing part of the inspection each day during the normal maintenance period. When the inspection and maintenance operation is thus spread over several days, the inspection is considered "made" as of the time (flying hours) at which it is completed.

d. No airplane, however, will be allowed to remain more than one month without a 25-hour inspection (irrespective of its flying time) except airplanes in depots undergoing overhaul and airplanes in "In Storage" status.

e. When performing this inspection as one continuous operation, attention should first be given to all parts, assemblies, and systems which, according to Form 1A and the Maintenance Inspection Record, are in need of maintenance, adjustments, or repairs, or which have recently required a large amount of such work.

f. If specialists, that is, propeller specialists, instrument specialists, etc., are to assist in the performance of this inspection, they should be assigned to the inspection of that equipment, as grouped in the columns of the Maintenance Inspection Record, which they are especially qualified to inspect and maintain.

9. 50-hour.—*a.* The 50-hour inspection includes the preflight, daily, and the 25-hour inspections. It is designed to be a complete, thorough, and searching inspection of the entire airplane as far as it is within the scope of the visual inspection system. The mechanic will assure himself that the parts inspected are in good condition and functioning properly and that the routine maintenance operations prescribed to be performed incidental to the inspections are properly accomplished. The inspections and maintenance required at the 50-hour inspection period are given in sections VI to XII, inclusive, and the approximate order in which they should normally be performed is given in section IV.

b. The 50-hour inspection and maintenance operation will be performed between the 40th and 60th flying hours after the completion of the last 50-hour inspection. If the inspection has not been completed by the 50th hour, the red dash, symbol for "Required Inspection Not Made," will be placed in the appropriate columns of Form 41B until the 60th hour, when the red diagonal will be entered in the appro-

priate columns until the required inspection is made. To avoid the necessity for maintaining the "Time Since Last 50-hour Inspection" separately for each engine and the airplane, it is necessary that a 50-hour inspection be made upon completion of engine change, or that upon completion of such change, the accumulated "Time Since Last 50-hour Inspection" be dropped. Whenever an engine is changed, the engineering officer of the unit or activity doing the work will determine whether a 50-hour inspection will be made or whether the accumulated time will be dropped.

c. It is not necessary that the 50-hour inspection be performed as one continuous operation with the airplane held "out of commission" from the time the inspection is started until the time the inspection is completed. The period of 20 flying hours (40th to 60th hour) allowed for the making of this inspection is to permit completion during normal maintenance periods without withdrawing the airplane from regular service or placing it "out of commission" for lengthy periods. It is thus permissible to spread the inspection over a period of several days, flying the airplane each day during the normal flying period and performing part of the inspection each day during the normal maintenance period. When the inspection and maintenance operation is thus spread over several days, the inspection is considered "made" as of the time (flying hours) at which it is completed.

d. No airplane will be allowed to remain more than 3 months without a 50-hour inspection, irrespective of its flying time, except airplanes in depots undergoing overhaul and airplanes in "In Storage" status.

e. When performing this inspection as one continuous operation, attention should first be given to all parts, assemblies, and systems which, according to Form 1A and the Maintenance Inspection Record, are in need of maintenance, adjustments, or repairs, or which have recently required a large amount of such work.

f. If specialists, that is, propeller specialists, instrument specialists, etc., are to assist in the accomplishment of the 50-hour inspection, they should be assigned to the inspection of that equipment as grouped in the columns of the Maintenance Inspection Record which they are especially qualified to inspect and maintain.

10. 100-hour and subsequent inspections.—The 100-hour and subsequent inspections will be performed at the same time as the applicable 50-hour inspections due. Symbols will be used for items of the inspection not completed under these inspection periods, in the manner prescribed for the 50-hour inspection.

11. Engine change.—Engines will normally be removed for

overhaul at the expiration of the periods listed in tables II and III of TO 00-25-4 (the desirable maximum number of flying hours between overhauls), except that additional flying time not to exceed 20 per cent of the number of hours listed may be authorized when the condition of the engine warrants. The authorization and final determination of the condition and serviceability of an engine is a responsibility of the station or air base engineering officer, consideration being given, in addition to actual inspection of engines, to any known characteristics peculiar to the equipment and to reports submitted by pilots on previous flights, that is, Form 1 and the Maintenance Inspection Record.

12. 25 hours after engine change.—The “25 hours after engine change inspection” will be performed between the 20th and 30th flying hours following an engine change. This is an engine “shake-down” inspection, at which time all special inspections incident to an engine change will be performed.

13. Special.—The special inspections and maintenance required are found in sections VI to XII, inclusive. Transient airplanes will be inspected and maintained in accordance with Army Air Forces Regulation 65-22.

SECTION III

MAINTENANCE INSPECTION RECORDS

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14. General.—A Form 41B will be maintained for each airplane assigned to the Army Air Forces.

15. Symbols.—*a.* Data relative to the inspection status, results of inspection, mechanical condition of the airplane, and maintenance

work as performed, will be recorded in the columns provided for that purpose on Form 41B by means of the following symbols:

(1) *Red cross (X)*.—This symbol indicates the existence of a defect or other unsatisfactory condition of such a nature that, until the defect is corrected or the condition remedied, the airplane is unsafe or unfit for flight.

(2) *Red diagonal (/)*.—This symbol indicates the existence of a minor defect, a need for minor maintenance, or some other unsatisfactory condition not serious enough to render the airplane unsafe for flight.

(3) *Red dash (—)*.—This symbol indicates "Required inspection not made."

(4) *Initial*.—The black last-name initial of the worker certifies "thoroughly inspected—condition satisfactory", except that, in columns 10, 19, and 30, the mechanic's initial indicates only that the required inspection was made.

(5) *Black circle (O)*.—This symbol around the black last-name initial of the worker indicates "Greased or oiled", except that, when appearing in column 46, "Batteries", it indicates routine addition of water to the batteries.

(6) *Black dash (—)*.—This symbol indicates "Inspection today not required by these instructions".

(7) *Vertical black line (|)*.—Drawn vertically through a column, this symbol indicates "not applicable".

16. Use of symbols.—a. Red cross (X).—Whenever a defect or other unsatisfactory condition exists in any system, part, or assembly of the airplane of such a nature that it renders the airplane unsafe for flight, or whenever maintenance work is required of such a nature that, if it remains undone, the airplane will be unsafe for flight, a red cross will be entered in the column provided for recording the status of the particular system, part, or assembly affected.

(1) Whenever the condition of any system, part, or assembly is indicated by a red cross, the airplane will be "grounded" and will not be flown until the defect is corrected or the necessary maintenance work completed, and the airplane is placed in safe condition for flight.

(2) It will not be necessary to enter a red cross to indicate an unsafe condition caused by the removal of parts or assemblies when the removal of such parts or assemblies is obvious and the mechanic who removed them remains at work on the airplane. However, if the removal of the parts or assemblies is not obvious, or if the mechanic leaves the immediate vicinity of the airplane for any reason whatsoever, a red cross will be entered in the appropriate column of the form to in-

dicade that the airplane is unsafe for flight, thereby eliminating any possibility of the airplane being inadvertently rolled out for flight.

(3) The repairs made or work done to remedy defects or other unsatisfactory conditions indicated by a red cross will be inspected by the flight or hangar chief, or the organization engineering officer or inspector, to insure that the work has been properly done and that nothing has been overlooked. If the work is found satisfactory by the individual inspecting it, he will indicate that he has inspected it and found it satisfactory by a signed statement in the "Remarks" column, substantially as follows: "Maintenance work indicated in columns

----- inspected and found satisfactory -----
(Name)-----." This is a "supervisory inspection" prescribed to insure that the parts are installed correctly, that proper adjustments have been made, and that all safeties are in place.

(4) The red cross (X) symbol serves the dual function of indicating that a serious defect exists or that for some reason (lack of maintenance, some structural part removed, fuel strainers not installed, etc.) the airplane is unfit for flight.

b. Red diagonal (/).—When a defect or other unsatisfactory condition exists in any system, part, or assembly of the airplane, not sufficiently serious to render the airplane unsafe or unfit for flight but of such a nature that it must be corrected before the airplane can be considered to be in first-class mechanical condition, a red diagonal will be entered in the column provided for recording the status of the system, part, or assembly affected.

(1) When the condition of any system, part, or assembly is indicated by a red diagonal, the airplane may be flown, provided that it is released for flight by the execution of an "Exceptional release."

(2) It will not be necessary to enter a red diagonal to indicate an unsatisfactory condition caused by the removal of parts or assemblies for inspection purposes when the removal of such parts or assemblies is perfectly obvious and the mechanic who removed them remains at work on the airplane. However, if the removal of the parts or assemblies is not perfectly obvious, or the mechanic leaves the immediate vicinity of the airplane for any reason whatsoever, a red diagonal will be entered in the appropriate column of the form to indicate the existence of an unsatisfactory condition, and that an "Exceptional release" is required before flight.

(3) The red diagonal (/) has the dual function of indicating that a minor defect exists or that routine maintenance work required by technical instructions (adjusting valves, compensating the compass, etc.) has not been completed.

c. Red dash (—).—This symbol is entered in the appropriate column whenever routine inspections of any system, part, or assembly required by technical instructions are not completed and indicates that an "Exceptional release" is required before flight.

d. Initial.—(1) The black last name initial of the mechanic is entered in a column whenever he inspects the system, part, or assembly covered by the column, and finds its condition satisfactory, except that in columns 10, 19, and 30, the mechanic's initial indicates only that the required inspection was made. Placed over a red symbol, the initial indicates that the mechanic has corrected the condition indicated by the symbol, has inspected the system, part, or assembly, and finds the condition to be satisfactory.

(2) A red symbol will never be placed over an initial. If defects occur or are discovered after entry of the initial, the initial will be erased before the symbol indicating the existence of the defects entered, except in the "Status today" columns.

e. Black circle (O).—This symbol is used to record the completion of routine oiling and greasing and the addition of water to the battery. It is not used to indicate the addition of oil to the engine oil system.

f. Black dash (—).—This symbol is entered in a column whenever the system, part, or assembly covered by the column requires no inspection on the particular day on which the entry is made, except that it will not be necessary to use this symbol to indicate that the 25-hour and 50-hour inspections are not due. The most common use of this symbol will be to indicate that a daily inspection is not required, if such is the case.

g. Vertical black line (|).—Whenever a system, part, or assembly, covered by a column, does not form a part of the airplane for which the form is maintained, a vertical line will be drawn through the column. For example, on the form maintained for an airplane without night-flying equipment, a vertical black line will be drawn through column 42.

h. Symbols entered on Form 41B by the crew chief, or the individual who makes inspections or performs work, will represent that individual's opinion as to the condition, defects, etc., and, therefore, no individual will be directed to change the symbol which he has entered. If the organization, engineering, or commanding officer believes that the condition is more or less serious than represented by the symbol, he may change the symbol, but he will indicate his action by a signed remark in column 47, substantially as follows: "Column ----- symbol changed from ----- to ----- (Name)." The officer who signs the remark will actually change the symbol and assume responsibility for his action.

i. The symbols prescribed in this section will also be used for indicating the status of the complete airplane in the "Status today" section.

17. Entries on new forms.—When a new Form 41B is started, the following entries will be transcribed from the last previous form:

a. Copy all identification and data entries under the title "Maintenance Inspection Record."

(1) If any part of this data is not available, the fact should be stated.

(2) In columns provided for engine and airplane inspections, enter airplane hours the next inspection will be due.

(3) In column "Other hourly inspections," enter routine inspections due at periods not listed.

b. Enter the data listed under the following columns: column 1, enter total time flown today; column 2, carry forward the total time recorded on the last Form 41B.

c. Enter the month the new form was started on the line "Month" in column 3.

d. "*Time of accessory equipment*".—Enter the name of the specific accessory and airplane hours installed for all accessories on which a time record is being maintained.

e. "*Remarks*" (column 47).—Copy whatever miscellaneous data it is desired to bring forward from the old form. Enter remarks explaining each red diagonal or cross not cleared.

f. Transcribe on line 1 of the new chart every entry from the last line of the previous form.

18. Maintenance entries.—a. Identification and data entries under the title "Maintenance Inspection Record" will be modified or corrected as follows:

(1) If, for any reason, changes are made which affect the fuel and oil capacity of the airplane, the recorded data will be changed.

(2) When a new crew chief is assigned, or a new additional assistant is assigned, enter his name and grade and the date assigned. When an assigned man is relieved, do not erase his name, but enter the date of his relief.

b. *Inspection schedule.*—(1) Enter the airplane hours at which the various hourly inspections are due, or the date on which the various calendar inspections are to be performed, as the case may be. At the time of each engine installation, enter the number of airplane hours at which the engine will be due for removal (see TO 00-25-4) and the number of airplane hours at which the engine will be due for a "25-hour after engine change" inspection.

(2) Upon the completion of any inspection other than "Preflight", "Daily—power plant", or "Daily—airplane", enter the airplane hours

(or the date) at which that particular inspection is required to be repeated.

(3) The calculation of flying time for making the 50-hour inspection will always start at zero after the completion of the inspection. Thus, if an airplane has 165 hours total time when the 50-hour inspection is started and the inspection is completed at 175 hours, the next 50-hour inspection will be due at 225 hours.

(4) All items of inspection not completed at the 25-hour period will be carried under a red dash in appropriate columns until 30 hours. Thereafter, such items as have not been inspected will be carried under a red diagonal until the required inspection is made. Likewise, all items of inspection not completed at the 50-hour period will be carried under a red dash between the 50th and 60th hours. Thereafter, such items as have not been inspected will be carried under a red diagonal until required inspection is made. Whenever work is in process but not completed at the end of the day, or whenever during the day the mechanic is called away from incompleted work, the provisions of paragraph 16b(3) will govern.

(5) "*Time of accessory equipment*".—These blocks will be used for the purpose of recording the time on any items of accessory equipment on which it is desired to maintain such a record. Columns are provided for the entry of the accessory name, airplane hours at installation, and airplane hours at removal of the accessory. In case the accessory has had operating time since being repaired and prior to the present installation, suitable notation will be made to indicate this previous operating time.

19. Horizontal lines.—*a.* One line across each page of the group of pages being used for daily entries will be used for each date on which—

- (1) The airplane is flown.
- (2) The airplane is serviced with fuel or oil.
- (3) Inspection or maintenance work is completed.

The above entries are made in column 47. An entry is also made in the section "Inspection record."

b. On the line preceding the first entry for each new month, enter the name of the month on each page and make no other entries on that line. The separate months covered will thus be visually indicated by a line that is blank across the form except for the name of the month.

c. Each time a horizontal line is used for an entry in any column the current date will be entered on the line used in the "Date" column, except when, at the end of the day, the status of the airplane is recorded in column 48 on the next lower horizontal line (in accordance

with par. 23e) a date will not be assigned that line until some other entry is made thereon.

d. A date once entered on any line assigns that line to that date throughout the entire group of pages, and so far as possible all entries for that date will be made on that line. Thus, one line will contain entries for only one date. (Entries for succeeding dates must be made on the lines assigned such dates. It will frequently occur that on a specific date an entry will be made on a line in only one column of the form. Therefore, when assigning a line to a date, care must be taken to ascertain that the line to be used is "open" throughout the entire form and has not been used in any section for an entry on a previous date.)

e. Whenever an entry is made on a horizontal line, other than the status entry required to be made at the end of the day on the next lower line by paragraph 23e, the following additional data will be entered or brought forward from the preceding line:

(1) The status of the daily inspection ("not due", "due but not made", etc.).

(2) Any uncleared red symbols, representing uncorrected defects, incompleted inspection or maintenance, etc., appearing in any column on the line immediately above.

(3) If not already entered, a symbol indicating the status of the airplane will be entered in the "Status today" section.

f. If the columnar space in such columns as "Defects reported by pilot", "Pilots' names", "Remarks", etc., is insufficient, the entry may be completed on the next lower line, in which case the two lines will be bracketed to indicate that they pertain to but one date.

20. Data to be transcribed from Airplane Flight Report.—a. As soon as possible after the complete Airplane Flight Reports (Forms 1 and 1A) are available to the crew chief, he will copy all pertinent data in the appropriate sections of the Form 41B.

(1) *Column 1, "Airplane time today".*—Enter the total flying time for the calendar day in hours and minutes regardless of the number of flights.

(2) *Column 2, "Total time".*—The flying time for each day, as shown by the entry in column 1, will be added to the last previous total in column 2 and the sum entered on the same date line used for the time entry in column 1. Thus the time figure in column 2 will represent the total flying time at the end of the day's flying.

(3) *Column 3, "Defects reported by pilot".*—Copy the pilot's remarks relative to the unsatisfactory condition or functioning of the aircraft or its accessories.

(4) *Column 4, "Pilots' names".*—Copy the names of the pilots who

flew the airplane on the particular day in the order shown on the airplane flight report.

(5) *Columns 5 through 8, "Oil serviced".*—Enter the quantity (quarts) of oil serviced to each engine during the day. The column numbers will designate the tanks serially from left to right. (See par. 21*d* (3).) Complete changes of oil will be indicated by underlining the entry in these columns to provide a ready reference for crew chiefs and inspection personnel. It will be necessary to obtain the time since last oil change from the corresponding entry in column 2.

(6) *Column 9, "Fuel serviced".*—Enter the total quantities in gallons of fuel serviced to the aircraft during the day.

(7) *Column 10, "Preflight inspection".*—Copy the last-name initial of the mechanic who made the preflight inspection. In the event that preflight inspection was not made, the red dash, symbol for "Required inspection not made", is entered.

(8) *Columns 11 through 17, "Auxiliary equipment".*—Copy the symbol representing the status of auxiliary equipment in the appropriate columns of this group.

(9) *Column 18, "Inspections completed today".*—Enter any inspections completed other than "Preflight" and "Daily."

(10) *Column 19, "Daily inspections—power plant," and column 30, "Daily inspections—airplane".*—Work completed and the results of the daily inspections are normally entered directly on Form 41B and transcribed to Form 1A. However, in the event that the original entry for the daily inspection is made on Form 1A, copy in the applicable column, the last-name initial of the individual who made the inspection, or the black or red dash in case the inspection was not due or, though due, was not made. Symbols indicating the results of inspection or work done during the inspection will not be entered in these columns, but will be entered instead in the appropriate column of the following groups: of columns 11 to 17, inclusive; 20 to 29, inclusive; and 31 to 46, inclusive.

(11) *Columns 20 through 29, and 31 through 46, "Inspected today".*—In the event Form 1A shows that defects were detected or maintenance work found necessary while the airplane was "on the line" or absent from the hangar, the proper symbols for recording such defects or maintenance work will be entered in the appropriate column.

(12) *Column 47, "Remarks".*—Copy any remarks appearing on Form 1A, explaining any defects, recording maintenance work performed and any instructions of the pilot relative to the accomplishment or omission of inspections or maintenance work.

(13) *Columns 48 and 49, "Status today".*—The status of the airplane is normally recorded on Form 41B and transcribed to Form 1A.

In the event, however, that the status was originally indicated on Form 1A, the status symbols will be copied to Form 41B. Any changes in the status during the day that were originally recorded on Form 1A will likewise be transcribed to Form 41B. If the airplane was flown under an "Exceptional release", originally recorded on Form 1A, the following note will be entered in column 49: "On Form 1A."

21. "Inspected today" (columns 10 through 46).—*a. Preflight inspection* (column 10).—(1) The completion or noncompletion of the preflight inspection normally will be recorded directly on Form 1A, by entry of the date on which made and the last-name initial of the mechanic who made the inspection, or, if not made, by the entry of a red dash, symbol for "Required inspection not made". (These entries record merely the performance or nonperformance of the inspections and not the results.)

(2) If defects are found, a symbol representing the most serious defect will be entered in the space provided on Form 1A for indicating the status of the airplane. The defects found and the corrective action taken will be recorded in detail on the Airplane Flight Report, for the information of the pilot and for entry on Form 41B.

b. Auxiliary equipment (columns 11 through 17).—Responsibility for making the prescribed operating and maintenance inspections of auxiliary equipment rests with the specialists charged with the maintenance of such equipment. The result of the daily operating inspection of auxiliary equipment is entered directly on Form 1A by the specialist making the inspection and is then transcribed to Form No. 41B by the crew chief, as prescribed in paragraph 20a(8). Auxiliary equipment is as follows:

- (1) Bombing, column 11.
- (2) Gunnery, column 12.
- (3) Tow target, column 13.
- (4) Chemical, column 14.
- (5) Communication, column 15.
- (6) Photographic, column 16.
- (7) Navigation, column 17.

c. Daily inspections (columns 19 and 30).—(1) Whenever a daily inspection of the airplane is complete, the mechanic who made the inspection will enter his last-name initial in column 30, regardless of the results of the inspection.

(2) If, during the inspection, it is found that defects exist or that maintenance work is required, the appropriate symbol to indicate such defects or required maintenance work will be entered in one or

more columns of the following groups: 11 to 17, inclusive; 20 to 29, inclusive; and 31 to 46, inclusive.

(3) If a daily inspection is not required, the black dash, symbol for "Inspection today not required", will be entered, except that a line will not be used solely for this purpose. (See (6) below.)

(4) If, though required by existing instructions, the daily inspection is not made, the red dash, symbol for "Required inspection not made", will be entered, except that a line will not be used solely for this purpose. (See (6) below.)

(5) An entry in these columns does not record the results of inspection; it merely records that a daily inspection has been made, that a daily inspection is not required, or that a daily inspection though required has not been made.

(6) The black dash, symbol for "Inspection today not required", or the red dash, symbol for "Required inspection not made", will not be entered in these columns, unless there are other entries on the line in some other section (excluding the status symbol entered at the end of the day in column 48 in accordance with par. 23e). Thus, a horizontal line will not be used solely to indicate that a daily inspection is not due or that, while due, a daily inspection has not been made.

(7) In accordance with the instructions contained herein relative to the entry of dates, the date of any entry in this column will be entered on the same horizontal line in the date column of all pages in the group.

(8) When an airplane is placed "out of commission" for the purpose of an engine change, a red "X" will be entered in column 19, "Daily inspections—power plant". The red "X" will be considered sufficient indication that the airplane is unfit for flight, and it will not be necessary to place an additional red "X" in other columns of the "Power plant" section. (The red "X" will also be carried forward to the "Status today" section, column 48.)

(9) Upon completion of the engine-change operation, including completion of any special inspections and maintenance work prescribed to be accomplished at engine change and the inspection of the actual work in connection with the engine change required by paragraph 16a(3), the red cross will be cleared in the prescribed manner by placing the last-name initial of the mechanic over the red "X" symbol.

d. "*Inspected today*" (columns 20 through 29 and 31 through 44).—

(1) These columns will be used to indicate the status or condition of the various parts or assemblies of the airplane and engine indicated by the column headings.

(2) The symbols to be used and their meanings are explained in paragraph 15.

(3) Each column in the section "Power plan" (columns 20 to 29, incl.) is divided into four sections to provide a method of separately indicating the status and condition of each engine. Symbols indicating the status or condition of systems or parts of the individual engines will be entered in the columns headed as follows:

(a) *Single-engine airplane*.—Column 1.

(b) *Two-engine airplane*.—L. H. engine, column 1; R. H. engine, column 2.

(c) *Four-engine airplane*.—L. H. outboard engine, column 1; L. H. inboard engine, column 2; R. H. inboard engine, column 3; R. H. outboard engine, column 4.

(4) The inspection and maintenance work required under each column at each inspection period is set forth in the handbooks (basic Technical Orders) for the airplane, engine, or individual item of equipment or installed accessories, and in the Maintenance Instruction Forms for the various models of airplanes.

e. *Column 45*.—This column is provided for local use as a means for entering any items not otherwise covered and for which another column is not provided.

f. *Special, column 46—"Battery"*.—(1) Maintenance and inspection data pertaining to the airplane battery will be recorded in this column. The weekly inspection maintenance requirements for the batteries are set forth in TO 03-5B-1. The performance of the required inspection and the fact that the battery or batteries are found to be in a satisfactory condition will be indicated by the entry of the black last-name initial of the mechanic performing the inspection.

(2) When water is added to a battery during inspection, the black circle will be placed around the last-name initial of the mechanic who added the water.

22. "Remarks" (column 47).—a. Whenever a symbol appears in any column of the group numbered 19 to 46, inclusive, indicating a dangerous condition, a defect, or that maintenance work is required or has been done, the specific condition, defect, repairs, replacement, adjustment, maintenance work, etc., indicated by the symbol, will be explained by a remark in column 47. Extra diagonals in one column will be indicated by a small figure under the diagonal. When one defect is removed, the remaining defects will be reentered in the "Remarks" column. Each remark will be preceded by the column number to which it pertains.

b. Suitable remarks will also be entered to explain symbols recording

the accomplishment of "one-time" changes, modifications, inspections, etc., directed by Technical Orders; to record any data, not specifically prescribed to be recorded in any other section, that the engineering officer of the organization or unit desires to record; and to record maintenance delays, etc., caused by lack of spares or supplies.

c. Whenever technical instructions, requiring nonperiodic inspection and changes in equipment that are to be made locally, are complied with, the symbol recording the work will be explained by a remark substantially as follows: "Technical Order No. --- complied with."

d. Whenever a defect reported by a pilot cannot be located or appears to have been reported in error, an appropriate remark will be entered to that effect. (The fact that corrective action cannot be taken will be reported to the engineering officer.)

e. Whenever the initial of a mechanic not listed in the heading of the form appears in any column, his name and grade will be entered in the "Remarks" column substantially as follows: (Daily inspection) (25-hour inspection) (Inspection of columns-----and-----) made by (Name and grade); this will identify the individual represented by the initial.

f. Whenever an individual conducts the inspection of completed work required by paragraph 16*a*(3), he will record such inspection in column 47.

g. Whenever an individual changes a symbol in accordance with paragraph 16*h*, he will record his action in column 47.

h. Whenever an airplane is involved in an accident or forced landing, a suitable entry will be made in the "Remarks" column. Such remarks will be brief, but will include the causes, if known, and the extent of the damage. Likewise, if the airplane is nosed up or an installed propeller is seriously damaged, a brief record of the occurrence will be entered.

i. When the airplane is dropped from the property records on a report of survey, an appropriate entry will be made in the "Remarks" column, showing the reason and the authority for the survey.

23. "Status today" (columns 48 and 49).—*a.* Columns 48 and 49 will be used to indicate the status of the complete airplane with reference to its mechanical condition, completion of the prescribed inspections, etc., and to record "Exceptional releases" granted. The "Status today" of the complete airplane will be indicated in column 48 by means of the symbols prescribed in paragraph 16. The symbol entered will be that which represents the most serious omission or defect recorded in columns 20 to 29, inclusive, and 31 to 46, inclusive.

(1) When making inspections of aircraft and recording the results

thereof in the appropriate columns, it will not be necessary to enter a status symbol in the "Status today" section until the inspection is completed, or until the mechanic making the inspection discontinues the inspection or leaves the immediate vicinity of the airplane for any reason. On completion of the inspection, discontinuance of work, or when leaving the immediate vicinity of the airplane, the mechanic will enter in the "Status today" section a symbol indicating the status of the airplane.

(2) When minor defects are discovered and immediately corrected, and the symbol showing the defect and the initial showing correction are entered on the form at the same time, it will not be necessary to carry forward to the "Status today" section the red diagonal indicating such minor defect.

b. A status symbol, once entered in a "Status today" symbol column, will not be initialed over, erased, or changed. Changes in the status of the aircraft during the day will be recorded in the next open symbol column to the right. In the event that more than two symbol columns are required to show the changes in status during any one day, the symbol columns of the next lower line will be used; the two lines thus used for one day will be bracketed together and dated in the manner outlined in paragraph 19f.

c. When the status of the airplane is indicated in column 48 by a red cross, the airplane will not be flown, nor may anyone authorize or direct that it be flown, until the dangerous defect or condition indicated by the red cross symbol is eliminated or corrected.

d. When the status of the airplane is indicated in column 48 by a red diagonal or red dash, the airplane may not be flown unless released for flight on an "Exceptional release."

(1) An "Exceptional release" will be granted by the squadron engineering officer to insure that he has direct knowledge of the fact that aircraft under his jurisdiction is being flown under an "Exceptional release." However, when this is impracticable, an "Exceptional release" may be granted by the pilot on Form 1A.

(2) The engineering officer who grants an "Exceptional release" assumes full responsibility for the mechanical safety of the airplane in flight. The fact that he grants an "Exceptional release" and records his action by his signature in the place provided therefor is considered a certificate to the effect that he considers the airplane safe for flight and that he has made sufficient inspection thereof to justify his opinion.

(3) An "Exceptional release," once granted by a squadron, flight, or aircraft engineering officer, is effective for the calendar day unless additional defects are detected, or unless it was granted with a "con-

dition"; that is, the airplane will not be flown on instruments or during darkness if instruments or night-flying equipment, respectively, was defective. An "Exceptional release," granted by a pilot, is effective only so long as that individual is functioning as pilot or co-pilot; pilots, on subsequent flights during the calendar day, must sign or initial the "Exceptional release."

(4) When practicable, the "Exceptional release" will be recorded by a signature directly on Form 41B. When so recorded, a remark substantially as follows will be entered on Form 1A: "On Form 41B."

(5) An individual other than an engineering officer who grants an "Exceptional release" indicates that he has assured himself that the defect or defects which necessitated the accomplishment of the "Exceptional release" will not adversely affect the mechanical safety of the airplane in flight.

e. Whenever the crew assigned to maintain the airplane has completed its work for the day, a symbol representing the status of the airplane at such time will be entered in column 48, on the next lower "open" horizontal line, provided that during the day just completed entries have been made in some column on the form (other than the entry recording the name of the month). The entry of the status symbol on the next lower "open" horizontal line will not be dated until the line on which it is made is used for an entry in some other section. The foregoing provisions will insure that before the first flight of the day, a status symbol, indicating the status of the airplane, will always be entered on the line on which the entries pertaining to that flight will later be recorded.

f. Until superseded by another symbol, the last symbol entered in the "Status today" section is assumed to represent the status of the airplane.

24. "Inspection record" (columns 50 through 54).—*a.* Inspections by supervisory maintenance personnel will be made in accordance with the following instructions:

(1) *Column 50, "Flight chief"*.—Each working day on which maintenance entries are recorded on the Maintenance Inspection Record, the flight chief will make such inspection of the aircraft and the records pertaining thereto as may be necessary to assure himself that the required inspections and maintenance work have been accomplished and that the required entries have been made on Form 41B. He will initial this column each working day to record his inspection.

(2) *Column 51, "Inspector"*.—At least once each 15 days, and preferably coincident with a regular 25-hour or 50-hour airplane inspection, the organization inspector will inspect the airplane and the

Maintenance Inspection Record pertaining thereto in such detail as may be necessary to determine the condition of the airplane and the accuracy of the entries on the Maintenance Inspection Record. He will record the completion of the required inspection by entering his initial in this column.

(3) *Column 52, "Engineering officer"*.—At least once each 30 days, the organization engineering officer will inspect each airplane and the Maintenance Inspection Record to determine the condition of the airplane, the manner in which routine inspection and maintenance work has been done, and the accuracy of the entries on the Maintenance Inspection Record. He will record the completion of the required inspection by entering his initial in this column.

(4) *Column 53, "Commanding officer"*.—At least once each 30 days, the organization commander will inspect the airplane and the Maintenance Inspection Record pertaining thereto in such detail as may be necessary to familiarize himself with the condition of the aircraft; the accuracy of the Maintenance Inspection Record, and the manner in which maintenance and subordinate supervisory personnel have performed their duties. He will enter his initial in this column to indicate completion of the inspection.

(5) *Column 54, "Higher authorities"*.—Whenever the airplane or the Maintenance Inspection Record is inspected by higher commanders or their representatives, the individual making the inspection will enter his initial or sign his name in column 54 to record the completion of such inspection.

(6) Higher commanders and their technical representatives should make frequent inspection of assigned equipment to determine the condition thereof and the standard of maintenance existing within the maintaining unit. As lack of time will frequently prevent commanding officers verifying many operations at one time, the so-called "spot-check" system should be used as follows:

(a) Three or more parts of the airplane, which the Maintenance Inspection Record indicates are in good condition, should be chosen at random and inspected by a competent and disinterested mechanic in the presence of the officer. If the condition of the parts is found satisfactory and in accordance with the condition indicated on the Maintenance Inspection Record, it may be assumed that the airplane is being properly maintained and that the record is accurate. If, however, defects, irregularities, or discrepancies are found, indicating that the mechanic is not properly maintaining the airplane or has made incorrect entries on the Maintenance Inspection Record, further investigation should be made and the corrective action taken.

(b) With practice, a "spot-check" inspection can be accomplished

in a comparatively short space of time. Frequent "spot-checks" by higher commanders, in addition to those conducted by the members of their technical staffs, are invaluable. They furnish commanding officers with direct, first-hand information concerning the equipment under their jurisdiction and the standard of maintenance existing within their organization.

25. Disposition of Form 41B.—*a.* When an airplane is transferred to another organization or activity, the squadron engineering officer will be responsible that the current Form 41B maintained for the airplane is forwarded to the new activity on the date the transfer is effected. When the transfer is made by air, the form will accompany the airplane.

b. The completed Form 41B will be maintained in the files of the organization for reference and information of inspection officers for a period of 6 months, after which they may be destroyed, provided they have been inspected by higher authority.

c. Forms 60A, 60B, and 61 will be transferred to a new Form 41B when the current Form 41B is completed.

d. Form 41B, maintained for aircraft dropped from the property records, will be retained until inspected by a representative of the Director of Technical Inspection, Washington, D. C.

e. Form 41B received at air depots with airplanes transferred thereto for depot inspection and repair, will be retained until completion of the depot inspection and repair. The form will then have entered thereon, on the first open horizontal line, the date of completion of the depot inspection and repair. In the "Remarks" column, a brief explanation of the work performed, such as "depot inspection and repair", "major repair", etc., will be entered, and the form replaced in the airplane. This information is also entered on Form 60A as a matter of permanent record.

26. Technical instruction compliance records and propeller historical record.—*a. General.*—The following forms will be prepared and maintained by all Army Air Forces activities for each item of equipment involved:

(1) Form 60A, Technical Instruction Compliance Record—Airplane.

(2) Form 60B, Technical Instruction Compliance Record—Engine.

(3) Form 61, Propeller Historical Record (for controllable propellers only).

b. Where maintained.—Form 41B is used to record Airplane Maintenance and Inspection, and Forms 60A, 60B, and 61 will be kept in the pocket provided in the back of Form 41B. Form 41B will be

kept in the office of the squadron engineering officer, except when it is being used by maintenance personnel to record the results of maintenance and inspection, or when the airplane is on a cross-country flight or is being transferred.

c. Initiation and entries.—All entries on Forms 60A, 60B, and 61, except signatures and initials of individuals, will be made by typewriter in accordance with the following instructions:

(1) Before a new airplane, engine, or controllable propeller is delivered from the contractor's plant to any activity, the Army Air Forces representative at the contractor's plant will initiate a Form 60A, 60B, or 61 as outlined below.

(2) In the event that a Form 60A, 60B, or 61 is lost, a new form will be prepared immediately. Every effort will be made to incorporate on the new form all the information contained on the lost form.

(3) In the event that technical instructions directing "one-time" inspections of, or changes in, new equipment, are received prior to the initiation of the form for such new equipment, the instructions, if required to be placed on Forms 60A and 60B, will be entered at the time the forms are initiated.

(a) If a Technical Order requires changes only in a certain group of model airplanes or engines, the serial numbers of the airplanes or engines affected will be listed in the Technical Order, if practicable, and the note at the heading of the Technical Order will require entry on Forms 60A and 60B "for the airplanes (or engines) affected".

(b) If a change specified by a Technical Order is to be adopted as standard and incorporated by the manufacturer on subsequent airplanes or engines, the Technical Order will so state. Occasionally, in such cases, a manufacturer will make a change in an airplane or engine which is listed in the Technical Order for change by the service. This fact will not preclude the entry of the Technical Order on the original Forms 60A and 60B, if required, but entry will be made and compliance by the manufacturer indicated in the column headed "Organization."

27. Entries on Forms 60A and 60B.—*a. General.*—Entries on Forms 60A and 60B will provide the following:

(1) A method for operating activities to record technical instructions directing "one-time" inspections, changes, or modifications.

(2) A record of the work performed when aircraft are sent to depots for the making of some technical change.

(3) A record of depot inspections and repairs of aircraft, the name of the depot that made such inspections, the technical instructions complied with, and the total flying time when such work was done.

(4) A record of overhauls of engines, the name of the depot per-

forming the overhaul, the technical instructions complied with, and the total flying time when such work was accomplished.

- *b. Front side of Forms 60A and 60B.*—(1) *Heading.*—The required data will be entered in the spaces provided under “Page No.”, “Date of purchase”, “Squadron No.”, “Installed in”, etc.

(2) *Technical instructions; time ordered; Form 55 required.*—(a) All technical instructions which direct the making of a technical change or a “one-time” inspection of an aircraft or an engine by service activities will contain in the heading a note requiring entries on Forms 60A and 60B and specifying when and by whom the work will be accomplished. Immediately upon receipt of technical instructions specifying completion by activities other than depots, and requiring entries on Forms 60A and 60B, the engineering officer (or the supply officer if the equipment is in storage) responsible for the equipment and having the Forms 60A and 60B in his possession will enter on the proper form the date, number, and title of the technical instructions; he will also indicate when the work is to be done by entering the proper note, such as “immediately”, “as soon as possible”, etc., in the columns headed “Time ordered”.

(b) Service activities will not make entries of technical instructions which specify work to be done only by depots. Such entries will be made as outlined in paragraph 29*d*. Frequently, in the interest of brevity, technical radiograms and telegrams do not contain the statement specifying when and by whom the work will be done, but whenever “one-time” inspections or changes in equipment are directed therein, the instructions will likewise be entered on Forms 60A or 60B, as applicable. If the technical instructions require the submission of W. D., A. A. F. Form No. 55. (Technical Order Compliance Report), in compliance with Army Air Forces Regulation 15-55, an asterisk will be inserted in the column headed “Form 55 required”.

(3) *Date completed; inspected; organization.*—Upon completion of the work directed by the technical instructions, the inspector of the squadron, unit, or activity responsible for the accomplishment of the work will enter the date the work is completed, the initials or name of the organization doing the work, and his own initials in the columns provided. The name of the organization need not be shown unless the work was done by an organization other than that of the aircraft. The inspector will also use Form 55, whenever submission of the form is specified. The engineering officer of the squadron, unit, or activity responsible for the completed work will then enter his initials in the column provided as an indication that the technical instructions have been properly complied with and that Form 55, if required, has been submitted.

(4) Whenever a Technical Order is received which replaces a previous issue of the same Technical Order (having the same number), a line will be drawn through the original entry on the Form 60A or 60B, regardless of whether the work has been accomplished or not, and a new entry will be made bearing the date of the last issue of the Technical Order. If the work has been accomplished prior to receipt of the latest issue, a notation to that effect will be made opposite the new entry. If a replaced Technical Order has not been complied with, a line will be drawn through the old entry on the forms and a notation made opposite the old entry that the Technical Order thus lined out has been replaced by Technical Order No. ----- dated ----- When a Technical Order replaces a previous Technical Order, and specifies additional work, a new number is usually assigned to insure that a new entry will be made on Forms 60A and 60B (if entry is required).

c. Reverse side of Forms 60A and 60B.—(1) *Record of associate equipment* (on Form 60A only).—Enter the model, serial number, date installed, date removed, and disposition of all engines installed in or removed from the aircraft. Spaces provided for entering airplane flying time under the headings “installed”, “Removed”, and “Total engine time” will also be filled in at the time of installation or removal of engines.

(2) *Record of transfers.*—Whenever an operating unit receives or transfers the equipment, including transfers for depot inspection and repair or engine overhaul, the name of the subdepot, the designation of the organization or activity, and the date of receipt or transfer will be entered. Shipment will be indicated by placing a small “s” immediately ahead of the date of shipment; receipt by placing a small “r” immediately in front of the date received. The hours since depot inspection and repair or engine overhaul and the total hours at date transferred will be recorded in the appropriate columns.

(3) The column headed “Inspected” will be initialed by the squadron or engineering officer of the activity, whenever the equipment is received or transferred. For received equipment, the initial will mean that the engineering officer has checked the record and the equipment to which it pertains, and is familiar with the status of technical compliance; for transferred equipment, it will mean that the form is correct and truly portrays the technical compliance status of the aircraft. This column will be initialed by the station engineering officer whenever he makes the inspections of received or transferred equipment required by TO 00-25-8.

(4) *Remarks.*—This column will show the dates of all depot inspection and repairs or engine overhauls, the name of the depot that

made the last depot inspection and repair or engine overhaul, and the total flying time when this work was done. It will also show such other information as would be of possible future interest or value, such as top overhaul of the engine, replacement of major assemblies on the airplane, damage to the equipment from accident or other cause, the oversize (when the engine is equipped with cylinders of oversize bore), and a list of service test equipment installed, if any.

(5) Whenever the space under any one of the headings on Forms 60A or 60B has been completely filled, additional forms will be used to continue the record. The spaces for "Page No.", "Airplane or engine model", "A. A. F. No.", "Date of purchase", "Squadron No.", and "Installed in" will be filled in on the new form, and subsequent entries will be made on this form until any one column is completely filled. Completed pages (those requiring no additional entries) will be securely stapled together and clipped to the active page or pages to constitute the complete Technical Order Compliance Record.

d. Entries made at depot or subdepot.—Upon receipt of airplane or engines, with accompanying Forms 60A, 60B, or both, for depot inspection and repair, engine overhaul or storage, and when equipment is issued from storage, the depot or subdepot will enter as a continuation of the record already on the forms, the following:

(1) All current technical instructions requiring entry thereon that were not entered by the activity from which the equipment was transferred (normally those instructions received by the activity after transfer of equipment).

(2) All technical instructions requiring entry that are received while the aircraft or engine is at the depot.

(3) Technical instructions, which direct one-time changes to or inspections of equipment and that are complied with by the depot, will be so indicated.

(4) When a technical change is made by a depot at a time other than at overhaul of an engine or depot inspection and repair of an airplane, only such Technical Orders as are complied with at that particular time and which direct one-time changes or inspection of equipment, will be entered by the depot.

(5) The column headed "Inspected" on the reverse side of Forms 60A and 60B will be initialed by the depot supply officer when airplanes or engines are received for storage, depot inspection and repair, or overhaul, and when airplanes or engines are shipped to another depot, subdepot, or other activity. The initials will indicate that all entries for which the supply officer is responsible have been properly made. Interdepartmental movements within a depot, such as the delivery of an airplane or an engine from a depot supply department to a

depot engineering department for accomplishment of work, or the return of airplanes and engines to the depot supply department after accomplishment of work, will not be considered as a transfer and no entries will be made in the "Record of transfer" spaces (columns) for such movements. No entries will be made in this space for airplanes or engines received at a depot for modification or repairs of a minor nature (where no transfer of accountability or shipping ticket is involved). All depot entries in this space will be made by the depot supply officer. This column will be initialed by the subdepot supply officer when airplanes or engines are shipped to or received from a depot, another subdepot, a squadron, or organization. The initials will indicate that all entries for which the subdepot supply officer is responsible have been properly made. Exceptions to this case are when the equipment is to be immediately reissued; then no entries are required.

(6) Whenever equipment is received for storage, or is issued from storage, by a depot or subdepot supply officer, the name of the depot or subdepot, the designation of the supply activity, and the date of receipt or issue, will be entered in the proper columns. Equipment received for immediate reissue or shipment to another organization will not be considered as being received for storage, and no entries by the supply officers are required in such cases.

28. Entries on Form 61.—*a. Front side of form.*—(1) *Heading.*—The required data will be entered in the heading as indicated thereby.

(2) *Station and date.*—On the upper line enter the name of the station making the installation, and on the second line enter the date.

(3) *Identification.*—Enter the A. A. F. serial number, or in case an A. A. F. serial number is not specified, enter the manufacturer's serial number of the hub assembly and each blade installed therein.

(4) *Total propeller hours at installation.*—Each time a propeller or blade is installed on an engine, enter the total operating time of the hub and each blade. This is obtained by subtracting the airplane hours at installation from the airplane hours at removal and adding the difference to the total propeller hours at installation shown in the preceding entry. The total thus secured will be the total hours of operation of the hub and each blade, for the next installation. In case of new propeller or blade the entry will be indicated as zero time.

(5) *Installed.*—Under the column headed "Engine model number and serial number" enter the engine model number as "V-1710-49," "R-1820-65," etc., in the upper line. In the second line, enter the engine serial number. Under the column headed "Airplane model and serial number," enter the airplane model designation as "P-38F,"

"B-17F," etc., in the upper line. In the second line, enter the airplane serial number. Under the column headed "Airplane hours at installation," enter the total hours since last overhaul of the airplane at time of installation, as shown by the last entry on Form 41B.

(6) *Removed*.—Whenever a controllable propeller is removed from an airplane for replacement of a blade, overhaul, engine change, or installation on another airplane, enter the name of the station at which the propeller is removed and the date of removal under the column headed "Station and date"; enter the total hours since last overhaul of the airplane at the time the propeller is removed (as shown by the last entry on Form 41B) under the column headed "Airplane hours at removal." (It is not necessary to make these entries when the propeller is removed for inspection and immediately reinstalled on the same airplane unless a new blade has been installed or the engine changed.)

(7) *Propeller hours since last overhaul*.—Whenever a controllable propeller is removed for replacement of a blade, installation on another airplane or engine, or overhaul, enter the operating time since last overhaul of the hub and each blade. This is obtained by subtracting the airplane hours at installation from the airplane hours at removal and adding to the difference the hub and blade hours since last overhaul, as shown in the preceding entry. The resultant total will be the operating hours of the hub and blade since last overhaul.

(8) *General overhaul*.—When a propeller is given a general overhaul, all columns under the headings "Installed" and "Removed" will be ignored. Under the heading "Station and date" enter the name of the activity performing the overhaul and the date thereof. Enter the serial numbers of the hub and installed blades in the identification column. The total propeller hours should be entered in the column headed "Total propeller hours at installation". Across the other columns enter the words "General overhaul".

b. Reverse side of form.—The reverse side of the form is provided for remarks regarding each entry appearing on the front; a brief description of each entry should be recorded as follows:

(1) The date the propeller was condemned or declared damaged beyond repair, and the reason for condemnation.

(2) The date a new blade was installed and the reason the blade it replaced was removed.

(3) Repairs made or parts replaced and the reason therefor.

(4) Compliance with Technical Orders directing one-time inspection or maintenance instructions.

(5) Each entry will be preceded by the name of the station and date work was accomplished.

29. Filing, maintenance, forwarding, and disposition of Forms 60A, 60B, and 61.—*a.* The engineering officer of the squadron, unit, or other activity actually maintaining the aircraft, if in service, is responsible for the maintenance of Forms 60A, 60B, and 61 for the equipment in possession of the squadron, unit, or other activity. He will be responsible for the proper entries on such forms while the equipment is under his jurisdiction. Forms 60A, 60B, and 61 will be filed in the envelope on the back of Form 41B, which will be kept in the files of the squadron engineering officer as outlined in paragraph 26*b*. Forms 60A, 60B, and 61 will be forwarded with Form 41B to the new organization whenever equipment is transferred.

b. For aircraft engines and propellers in storage the supply officer (depot or station) having jurisdiction over the equipment will maintain Forms 60A, 60B, and 61 pertaining thereto, and will be responsible that all technical instructions which must be complied with by the operating activity when the equipment is placed in service are listed on Forms 60A and 60B. In the event the work directed by such instructions is required to be accomplished prior to issue, the supply officer is responsible that the data relative to such accomplishment are properly entered.

c. When a controllable propeller blade is returned to stock or transferred as an individual blade rather than a part of a complete propeller, a Propeller Historical Record Card (Form 61) will be prepared for that blade, listing so much of the data called for on the record as may be available. When the blade is returned to stock, the historical record card for that blade will be filed by the supply officer as directed herein. If the blade is transferred, the historical record card will be transferred with it. It is essential that the operating time of a separate or spare blade be made a matter of record, so that it can be carried forward when the blade is assembled in a hub. However, blades received from a contractor as spares need not be recorded until installed in a propeller assembly.

d. Whenever equipment is transferred to a depot or to another organization or activity for operation, necessary work, or storage, Forms 60A, 60B, and 61 pertaining thereto will be promptly forwarded to the new organization or activity. Should the equipment be flown to the new destination, the forms will accompany the aircraft. When the equipment is shipped, the forms will be forwarded in a waterproof envelope attached to the airplane, engine, or propeller.

e. Depots will be responsible for the maintenance of the forms throughout the entire period aircraft engines or propellers are at the depot for work or storage, and will make all entries required thereon. While aircraft engines and propellers are at the depot, the officer

under whose jurisdiction the equipment may be at any time is responsible for the maintenance of Forms 60A, 60B, and 61. Thus, if the propeller, engine, or aircraft is in the engineering department for the purpose of work of any nature, the engineering officer is responsible; and if the equipment is in the custody of the supply officer prior to or following the completion of work of any nature, the supply officer is responsible for the maintenance of the forms and necessary entries thereon.

f. When the equipment to which these forms pertain is dropped from the records (Report of Survey or I. and I. Report), the Technical Instruction Compliance Records (Forms 60A, 60B) and Propeller Historical Record (Form 61) will be retained for a period of 6 months by the supply officer last accountable, after which they may be destroyed, provided they have been inspected by a representative of the office of the Director of Technical Inspection.

30. Sample completed Forms 41B, 60A, 60B, and 61.—In order to assist new maintenance personnel in filling in Forms 41B, 60A, 60B, and 61 in the manner prescribed by this manual, sample completed forms are shown in figures 1 to 13, inclusive. The encircled numbers on Form 41B are explained as follows:

a. Encircled 1 (fig. 1).—This is the complete last horizontal line carried forward from the previous Form 41B.

b. Encircled 2 (fig. 1).—This line is blank across the complete form, with the exception of the word "July", which indicates the starting of a new month.

c. Encircled 3 (fig. 1).—This bracket indicates that two lines were used to record maintenance and inspection on July 9.

d. Encircled 4 (fig. 2).—Since no two-target equipment is installed, a vertical black line is drawn through column 13.

e. Encircled 5 (fig. 2).—A black line under the quantity of oil serviced to the airplane indicates that the oil system was drained and 98 quarts of oil put in each tank.

f. Encircled 6 (fig. 2).—Galloway checked the radios, and since his name did not appear under the headings "Crew chief" or "Assistant", his name must appear in the "Remarks" column.

g. Encircled 7 (fig. 3).—There were two conditions in these columns which required red diagonals, therefore the numeral 2 was placed under the red diagonal and the appropriate remarks made in column 47.

h. Encircled 8 (fig. 5).—This initial indicates that the battery was checked.

i. Encircled 9 (fig. 5).—This symbol indicates that water was added to the battery.

A. A. F. AIRPLANE NO. 42-7615 MODEL B-20B (ENTER FROM AIRPLANE FLIGHT REPORT)

LINE NUMBER	DATE	AIRPLANE		DEFECTS REPORTED BY PILOT	PILOT'S NAME
		TIME TODAY	TOTAL TIME		
		1	2	MONTH <u>June</u>	
1	19	1:20	412:20	① O.K.	Lt. Smith
2	20	9:15	421:35	*1 Engine missing on left switch	Lt. Brown, Lt. Smith, Capt. Green
3	21	1:00	422:35		Maj. Jones
4	22	4:15	426:50	*1 Engine exhaust collector ring broken	Lt. Brown, Capt. Green
5	23				
6	24	0:45	427:35	O.K.	Lt. Smith, Col. May
7	27	7:30	435:05	O.K.	Capt. Green, Maj. Jones, Lt. Smith
8	28	2:00	437:05	O.K.	Lt. Smith, Capt. Green
9	29	2:40	439:45	*2 Engine ammeter fluctuates all the time	Lt. Brown, Capt. James
10				July ②	
11	1	5:10	444:55	O.K.	Col. White, Lt. Smith
12	3	3:25	448:20	1 O.K.	Col. White, Lt. Smith
13	4	4:00	452:20	O.K.	Col. White, Lt. Smith
14	7	6:00	458:20	O.K.	Col. White, Lt. Smith
15	8	5:10	463:30	Both engines running rough	Col. White, Lt. Smith
16	9				
17	9				
18	9				
19	10				
20	10				
21					
22					
23					

FIGURE 1.—W. D., A. A. F. Form No. 41B (columns 1 to 4).

(ENTER FROM AIRPLANE FLIGHT REPORT) A. A. F. AIRPLANE NO. 42-7615 MODEL B-20B

SERVICED					FUEL GAL.	PRESSURE INSPECTION	INSPECTED TODAY							REMARKS	LINE NUMBER
OIL QUARTS				AUXILIARY EQUIPMENT			BOSSING	GUNNERY	TOW TARGET	CHEMICAL	COMMUNICATIONS	PHOTOGRAPHIC	NAVIGATION		
1	2	3	4												
5	6	7	8	9	10	11	12	13	14	15	16	17	47		
17	16			135	B					G			①	1	
144	144			1170	B					G			(15) Sgt. Galloway checked radio	2	
					B					G				3	
80	81			650	B					G				4	
					B					G				5	
					D					G				6	
128	127			1027	D					G				7	
					D					②			(15) Sgt. Galloway checked radio, installed new microphone	8	
65	66			520						G				9	
					D									10	
80	81			495	N					G				11	
					N					G				12	
113	115			910	B					G				13	
95	95			588	B					G				14	
84	83			499	N					G				15	
														16	
232	232			⑤										17	
														18	
														19	
														20	
														21	
														22	
														23	

FIGURE 2.—W. D., A. A. F. Form No. 41B (columns 5 to 17, 47).

[illegible]

NOTE.—Symbols (diagonals, crosses, dashes) are red.

POWER PLANT (Continued)												REMARKS	LINE NUMBER	
MANIFOLDS AND SUPERCHARGERS				PROPELLERS AND ACCESSORIES				GENERAL						
27				28				29						
1	2	3	4	1	2	3	4	1	2	3	4			
												47		
													(22) Installed new Spark Plugs #3 and #5 cylinder	1
													(27) Exhaust collector ring removed for repairs (left engine)	2
													(28) Col Holmes complied with T.O. 02-10-10 Inspected and found O.K. RC Recd	3
													(27) Installed a new exhaust collector ring	4
														5
													(22) Cleaned points, generator control box	6
														7
														8
														9
														10
														11
													(29) 50 hour inspection due	12
														13
														14
														15
													(29) Started 50 hr. inspection. (22) Installed new plugs + cleaned and adjusted mag breaker points (28) Grease counter weights and tighten caps, smooth out several nicks (29) Changed oil	16
													(24) Tension support straps left engine, Re place safety wire, oil by-pass regulator.	17
														18
														19
														20
														21
														22
														23

NOTE.—Symbols (diagonals, crosses, dashes) are red.

A. A. F. AIRPLANE NO. <u>42-7615</u> MODEL <u>B-20B</u>		INSPECTED TODAY																		
LINE NUMBER	DATE	AIRPLANE															NAVIGATION INSTRUMENTS		BATTERIES	REMARKS
		30	31	32	33	34	35	36	37	38	39	40	41	42	43	44	45			
1	19 B																			
2	20 B																			
3	21 B	N	N	N	N	N	N	N	N	N	N	N	N	N	N	N	N			B (43) Started 25 hr. insp. (3) Stop leak in tail wheel
4	22 B																			
5	23 B																			
6	24 B																			(42) Installed a new left landing light
7	27 B																			
8	28 B																			
9	29 B																			(8) (9)
10																				
11	1 D																			(44) Compass due for swing
12	3 N																			
13	4 W																			(43) 50 hr. inspection due
14	7 B																			
15	8 W																			
16	9																			
17	9																			Started 50 hr. inspection. (46) Removed
18	9																			(31) Repaired broken cabin seat
19	10																			(46) Installed new batteries
20	10																			(44) Swung compass 7-10-42
21																				
22																				
23																				

FIGURE 5.—W. D., A. A. F. Form No. 41B (columns 30 to 47).

NOTE.—Symbols (diagonals, crosses, dashes) are red.

A. A. F. AIRPLANE NO. _____ MODEL _____	
REMARKS	LINE NUMBER
	47
	1
	2
Strut (37) Installed new clamp on hydraulic line right oleo cylinder. (42) Left landing light reflector cracked.	3
	4
reflector (43) Completed 25 hour inspection. (Sgt Youmen)	5
	6
	7
	8
	9
	10
	11
	12
	13
	14
batteries, sent to battery shop for replacement	15
	16
	17
	18
Completed 50 hour inspection.	19
	20
	21
	22
	23

FIGURE 6.—W. D., A. A. F. Form No. 41B (column 47).

A.A.F. AIRPLANE NO. 42-7615 MODEL B-20B

STATUS TODAY							INSPECTION RECORD					
LINE NUMBER	DATE	DO NOT ERASE SYMBOL—IF STATUS CHANGES USE NEXT "SYMBOL" COLUMN. A RED—OR/REQUIRES SIGNATURE OF AN A.A.F. OFFICER UNDER "EXCEPTIONAL RELEASE" BEFORE THE AIRPLANE IS FLOWN.					INSPECT AT INTERVALS AS DIRECTED BY INSTRUCTIONS—INDICATE INSPECTIONS HEREUNDER					
		SYMBOL	EXCEPTIONAL RELEASE	SYMBOL	EXCEPTIONAL RELEASE	SYMBOL	EXCEPTIONAL RELEASE	FLIGHT CHIEF	INSPECTOR	ENGINEERING OFFICER	COMMANDING OFFICER	HIGHER AUTHORITIES
		48	49	50	51	52	53	54	55	56	57	58
1	19	B										
2	20	B										
3	21	D										
4	22	X	St. Brown	X	My Jones							
5	23	X		X								
6	24	X		X	H. Smith	D						
7	27	D										
8	28	D										
9	29	B										
10												
11	1	-	H. Smith									
12	3	-	H. Smith									
13	4	-	H. Smith									
14	7	-	H. Smith									
15	8	-	H. Smith									
16	9	/										
17	9	/										
18	9	/										
19	10	/										
20	10	/										
21		B										
22												
23												

FIGURE 7.—W. D., A. A. F. Form No. 41B (columns 48 to 54).

NOTE.—Symbols (diagonals, crosses, dashes) are red.

OBVERSE SIDE OF FORM 60A

WAR DEPARTMENT
ARMY AIR FORCES
Form No. 60A
(Revised Sept. 15, 1942)

TECHNICAL INSTRUCTION COMPLIANCE RECORD

Page No. 1

Airplane Model B-20B Serial Number 42-7615 Date of Purchase 8-27-41 Squadron No. 30th Bomb

DATE	NUMBER	TITLE	TIME ORDERED	Form 55 Required	DATE COMPLETED	INSPECTED		ORGANIZATION
						Inspector	Engineering Officer	
12-30-41	01-190EA-17	Reinforcement of Nose Wheel Shock Strut	Next 50 Hours	x	1-5-42	Y.H.	R.C.B.	Flying Br.
1-14-42	01-190EA-20	Replacement of Type G-2 Generator with Type G-3.	Next 100 Hours	x	2-5-42	B.F.	V.H.	10th Bomb. Sq.
1-18-42	08-10-175	Inspection of Command Set Mounting.	Soon as Practicable	x	2-5-42	B.F.	V.H.	10th Bomb.
1-18-42	01-190EA-24	Modification of Fuel Cell Vent System.	Soon as Possible	x	2-5-42	B.F.	V.H.	10th Bomb.
2-4-42	01-190EA-30	Installation of Bomb Release Interval Control.	Immediate	x	2-5-42	B.F.	V.H.	10th Bomb.
4-30-42	01-190EE-4	Relocation of Rudder Cable Fairlead	Next 25 Hours	x	5-7-42	S.H.	S.L.B.	30th Bomb.
5-1-42	01-190EA-39	Addition of Access Holes in Upper Turret Support Bulkhead	Soon as Practicable		5-7-42	S.H.	S.L.B.	30th Bomb.

FIGURE 8.—W. D., A. A. F. Form No. 60A (obverse side).

A. A. F. AIRPLANE NO. <u>42-7615</u> MODEL <u>B-20B</u>		INSPECTED TODAY																			
LINE NUMBER	DATE	AIRPLANE															NAVIGATION INSTRUMENTS		BATTERIES	REMARKS	
		30	31	32	33	34	35	36	37	38	39	40	41	42	43	44	45	46			
1	19 B																				
2	20 B																				
3	21 B	N	N	N	N	N	N	N	N	N	N	N	N	N	N	N	N	N			(41) Started 25 hr insp. (3) Stop leak in tail wheel
4	22 B																				
5	23 B																				
6	24 B																				(42) Installed a new left landing light
7	27 B																				
8	28 B																				
9	29 B																				
10																					
11	1 D																				(44) Compass due for swing
12	3 N																				
13	4 W																				(43) 50 hr. inspection due
14	7 B																				
15	8 W																				
16	9																				Started 50 hr. inspection. (46) Removed
17	9																				(31) Repaired broken cabin seat
18	9																				
19	10																				(46) Installed new batteries
20	10																				(44) Swung compass 7-10-42
21																					
22																					
23																					

FIGURE 5.—W. D., A. A. F. Form No. 41B (columns 30 to 47).

NOTE.—Symbols (diagonals, crosses, dashes) are red.

A. A. F. AIRPLANE NO. _____ MODEL _____	
REMARKS	LINE NUMBER
	47
	1
	2
Strut (37) Installed new clamp on hydraulic line right oleo cylinder. (42) Left landing light reflector cracked.	3
	4
reflector (43) Completed 25 hour inspection. (Sgt Youman)	5
	6
	7
	8
	9
	10
	11
	12
	13
	14
batteries, sent to battery shop for replacement	15
	16
	17
	18
Completed 50 hour inspection.	19
	20
	21
	22
	23

FIGURE 6.—W. D., A. A. F. Form No. 41B (column 47).

A.A.F. AIRPLANE NO. 42-7613 MODEL B-20B

STATUS TODAY							INSPECTION RECORD					
LINE NUMBER	DATE	DO NOT ERASE SYMBOL—IF STATUS CHANGES USE NEXT "SYMBOL" COLUMN. A RED—OR/REQUIRES SIGNATURE OF AN A.A.F. OFFICER UNDER "EXCEPTIONAL RELEASE" BEFORE THE AIRPLANE IS FLOWN.						INSPECT AT INTERVALS AS DIRECTED BY INSTRUCTIONS—INDICATE INSPECTIONS HEREUNDER				
		SYMBOL	EXCEPTIONAL RELEASE	SYMBOL	EXCEPTIONAL RELEASE	SYMBOL	EXCEPTIONAL RELEASE	FLIGHT CHIEF	INSPECTOR	ENGINEERING OFFICER	COMMANDING OFFICER	HIGHER AUTHORITIES
		48	49	48	49	48	49	50	51	52	53	54
1	19	B										
2	20	B					B					
3	21	D										
4	22		St. Brown			May Jones						
5	23											
6	24					H. Smith	D					
7	27	D										
8	28	D										
9	29	B										
10												
11	1											
12	3											
13	4											
14	7											
15	8											
16	9											
17	9											
18	9											
19	10											
20	10						B					
21		B										
22												
23												

FIGURE 7.—W. D., A. A. F. Form No. 41B (columns 48 to 54).

NOTE.—Symbols (diagonals, crosses, dashes) are red.

OBVERSE SIDE OF FORM 60A

WAR DEPARTMENT
ARMY AIR FORCES
Form No. 60A
(Revised Sept. 15, 1942)

TECHNICAL INSTRUCTION COMPLIANCE RECORD

Page No. 1

Airplane Model B-20B Serial Number 42-7613 Date of Purchase 9-27-41 Squadron No 30th Bomb

DATE	NUMBER	TITLE	TIME ORDERED	Form 55 Request	DATE COMPLETED	INSPECTED		ORGANIZATION
						Inspector	Engineering Officer	
12-30-41	01-190EA-17	Reinforcement of Nose Wheel Shock Strut	Next 50 Hours	x	1-5-42	V.H.	R.C.B.	Flying Br.
1-14-42	01-190EA-20	Replacement of Type G-2 Generator with Type G-3.	Next 100 Hours	x	2-5-42	B.F.	V.H.	10th Bomb. Sq.
1-18-42	08-10-175	Inspection of Command Set Mounting.	Soon as Practicable	x	2-5-42	B.F.	V.H.	10th Bomb.
1-18-42	01-190EA-24	Modification of Fuel Cell Vent System.	Soon as Possible	x	2-5-42	B.F.	V.H.	10th Bomb.
2-4-42	01-190EA-30	Installation of Bomb Release Interval Control.	Immediate	x	2-5-42	B.F.	V.H.	10th Bomb.
4-30-42	01-190EE-4	Relocation of Rudder Cable Fairlead	Next 25 Hours	x	5-7-42	J.H.	J.L.B.	30th Bomb.
5-1-42	01-190EA-39	Addition of Access Holes in Upper Turret Support Bulkhead	Soon as Practicable		5-7-42	J.H.	J.L.B.	30th Bomb.

FIGURE 8.—W. D., A. A. F. Form No. 60A (obverse side).

REVERSE SIDE OF FORM 60A

RECORD OF ASSOCIATE EQUIPMENT							DISPOSITION	REMARKS Provide each remark with month of station and date. Enter each accident which resulted in damage or was caused by material failure. Show cause and results.
ENGINE MODEL	A A F OR SERIAL No.	INSTALLED		REMOVED		TOTAL ENGINE TIME		
		Date	Airplane Time	Date	Airplane Time			
R-2600-49	41-2896	Factory	00:00	10-13-41	109:25	109:25		
R-2600-49	41-3030	Factory	00:00	10-28-41	398:40	398:40		
R-2600-49	41-2991		10-13-41	109:25	11-11-41	530:10	420:45	
R-2600-49	41-3007		10-28-41	398:40	12-23-41	773:55	375:15	
R-2600-53	42-456		11-12-41	530:10	2-10-42	1190:00	660:00	
R-2600-53	42-1200		12-24-41	773:55	3-4-42	1299:10	525:15	
R-2600-49	41-3278		2-11-42	1190:00	3-18-42	1517:50	327:50	
R-2600-53	42-3898		3-5-42	1299:10	3-18-42	1517:50	218:40	
R-2600-53	42-3888		3-19-42	1517:50	5-1-42	2000:00	482:10	
R-2600-53	42-1834		3-19-42	1517:50	5-1-42	2000:00	482:10	
R-2600-53	42-1833		5-3-42	2000:00				
R-2600-53	42-567		5-3-42	2000:00				

RECORD OF TRANSFERS					
RECEIVED BY AND SHIPPED BY		DATE	HOURS SINCE D I R	TOTAL HOURS	INSPECTED Sig of Eng. Off Tech Order 00-15-1
Station	Organization				
r Wright Fld.	Flying Branch	9-28-41	New	10:00	R. C. Boehme
s Wright Fld.	Flying Branch	1-14-42	New	975:30	R. C. Boehme
r Patterson Fld.	10th Bomb. Sq.	1-14-42	New	975:45	V. J. Hawley
s Patterson Fld.	10th Bomb. Sq.	5-5-42	New	2020:15	V. J. Hawley
r MacDill Fld.	30th Bomb. Sq.	5-5-42	New	2025:10	J. L. Burlingame

FIGURE 9.—W. D., A. A. F. Form No. 60A (reverse side).

OBSERVE SIDE OF FORM 60B

WAS DEPARTMENT ARMY AIR FORCES Form No. 60B (Revised Sept. 15, 1942) Engine model R-2600-49 A. A. F. No. 41-2996							TECHNICAL INSTRUCTION COMPLIANCE RECORD			PAGE No. 1		
							Installed in: Airplane Model B-26B Serial Number 42-7615					
TECHNICAL INSTRUCTION							TIME ORDERED	Form 15 Required	DATE COMPLETED	INSPECTED		ORGANIZATION
DATE	NUMBER	TITLE				Inspector				By		
12-22-41	02-150YP-31	Inspection of Hydraulic Pressure Generator Drives				Soon as Practicable		1-5-42	J. N. R. C. B.		10th Bomb.	
1-3-42	02-150YP-32	Modification of Supercharger Rear Housing Cover				Next 25 Hours	x	1-5-42	J. N. R. C. B.		10th Bomb.	
1-16-42	02-150YP-34	Installation of Dual Accessory Drive Assembly				Soon as Practicable		2-2-42	A. F. J. L. B.		30th Bomb.	
1-29-42	02-150YP-35	Reworking of Buried Camshaft Dampers				Soon as Possible	x	2-2-42	A. F. J. L. B.		30th Bomb.	
2-7-42	02-150YP-40	Removal of Pipe Plug from Supercharger Housing				Next 25 Hours		2-15-42	A. F. J. L. B.		30th Bomb.	

FIGURE 10.—W. D., A. A. F. Form No. 60B (obverse side).

REVERSE SIDE OF FORM 60B

RECORD OF TRANSFERS						REMARKS Provide each remark with name of station and date. Enter each accident which resulted in damage or was caused by material failure Show cause and result.
RECEIVED BY AND SHIPPED BY		DATE	HOURS SINCE OVERHAUL	TOTAL HOURS	INSPECTED By. of Eng. or Tech. Order 90-11-6	
Station	Organization					
e Wright Fld.	Flying Branch	12-22-41	New	10:30	R. C. Beckner	FAD 3-15-42 GENERAL OVERHAUL
e Wright Fld.	Flying Branch	2-1-42	New	420:15	R. C. Beckner	
r Patterson Fld.	10th Bomb. Sq.	2-1-42	New	420:30	V. L. Harvey	
e Patterson Fld.	10th Bomb. Sq.	2-10-42	New	450:15	V. L. Harvey	
r MacDill Fld.	30th Bomb. Sq.	2-10-42	New	456:15	J. L. Boulough	
e MacDill Fld.	30th Bomb. Sq.	2-15-42	New	600:05	J. L. Boulough	
r F.A.D.	Engineering	2-15-42	New	604:35	M. J. Felt	
e F.A.D.	Engineering	4-25-42	70:30	604:35	M. J. Felt	
r Wright Fld.	Flying Branch	4-25-42	00:30	607:05	R. C. Beckner	
e Wright Fld.	Flying Branch	5-15-42	160:30	767:05	R. C. Beckner	
r Patterson Fld.	10th Bomb. Sq.	5-15-42	160:45	767:20	V. L. Harvey	

FIGURE 11.—W. D., A. A. F. Form No. 60B (reverse side).

OBVERSE SIDE OF FORM 61

Form No. 61 WAR DEPARTMENT A. A. F. (Revised Oct. 11, 1940) Propeller type Hamilton Standard Hydromatic Purchase order No. W531AC-16000										PAGE No. 1 Din. 12" 6" Date received 9-10-41 Hub drawing No. 3E50-101 Blade drawing No. 6105-A-10									
STATION AND DATE		IDENTIFICATION A. C. SERIAL NUMBERS		TOTAL PROPELLER HOURS AT INSTALLATION	INSTALLED ENGINE MODEL AND SERIAL NUMBER		AIRPLANE MODEL AND SERIAL NUMBER	AIRPLANE HOURS AT INSTALLATION	REMOVED STATION AND DATE		AIRPLANE HOURS AT REMOVAL	PROPELLER HOURS SINCE LAST OVERHAUL							
Wright Field	Hub No. 41-5371			0:00	R-2600-49	B-20B	NEW	Patterson Field	12-17-41	350:00	350:00	350:00							
	Blade No. 41-6351		0:00	350:00															
	Blade No. 41-6352		0:00	350:00															
	Blade No. 41-6353		0:00	350:00															
9-27-41	Blade No.				41-2096	42-7615													
Patterson Field	Hub No. 41-5371			350:00	R-2600-41	B-20A	575:00	Bolling Field	3-15-42	720:00	494:20	494:20							
	Blade No. 41-6351		350:00	494:20															
	Blade No. 41-6352		350:00	494:20															
	Blade No. 41-6353		350:00	494:20															
12-20-41	Blade No.				41-372	42-573													
Bolling Field	Hub No. 41-5371			494:20	R-2600-41	B-20A	720:00	Maxwell Field	5-1-42	935:15	709:35	709:35							
	Blade No. 41-6351		494:20	709:35															
	Blade No. 41-6352		494:20	709:35															
	Blade No. 41-7615		0:00	215:15															
3-20-42	Blade No.				41-372	42-573													
Maxwell Field	Hub No. 41-5371			709:35	R-2600-41	B-20A	935:15	Drew Field	7-4-42	1270:10	1050:30	1050:30							
	Blade No. 41-6351		709:35	1050:30															
	Blade No. 41-6352		709:35	1050:30															
	Blade No. 41-7615		215:15	550:10															
5-3-42	Blade No.				42-1701	42-573													
Drew Field	Hub No. 41-5371			1050:30	R-2600-49	B-20B	775:00	MacDill Field	8-30-42	1095:00	1370:30	1370:30							
	Blade No. 41-6351		1050:30	1370:30															
	Blade No. 41-6352		1050:30	1370:50															
	Blade No. 41-7615		550:10	876:10															
7-9-42	Blade No.				41-6573	43-3754													
MacDill Field	Hub No. 41-5371			1370:30	R-2600-49	B-20B	1095:00	Wright Field	10-10-42	1255:10	160:10	160:10							
	Blade No. 41-6351		1370:30	160:10															
	Blade No. 41-6352		1370:30	160:10															
	Blade No. 41-7615		876:10	160:10															
9-3-42	Blade No.				41-6573	43-3754													
Wright Field	Hub No. 42-1411			0:00	R-2600-49	B-20B	1255:10												
	Blade No. 42-125		1550:40																
	Blade No. 42-126		1550:40																
	Blade No. 41-7615		1050:20																
10-12-42	Blade No.				41-6573	43-3754													

FIGURE 12.—W. D., A. A. F. Form No. 61 (obverse side).

REVERSE SIDE OF FORM 61

REMARKS		
Precede each entry with the name of the station and date		
3-15-42	Bolling Field	Removed Blade No. 41-6353 damaged by gun fire and replaced with Blade No. 41-7615
9-3-42	MacDill Field	General Overhaul. T.O. 83-20-5 complied with
10-10-42	Wright Field	Removed Hub No. 41-5371 because of cracks and replaced with Hub No. 42-1411

FIGURE 13.—W. D., A. A. F. Form No. 61 (reverse side).

j. Encircled 10 (fig. 7).—The note “On Form 1A” indicates that the exceptional release was signed by the pilot on Form 1A.

SECTION IV

ORDER OF INSPECTION

General.....	Paragraph 31
Order of inspection.....	32

31. General.—*a.* The various groups of airplane equipment have been arranged on Form 41B under two main headings: “Inspection schedule” and “Inspected today”. For the purpose of classifying the large number of inspection requirements, these groups are further divided into their component parts and subassemblies. The groups and their subdivisions, arranged in a logical order for inspection, are tabulated in paragraph 32 in the form of an index giving the paragraphs in which the inspection requirements, period of inspection, pertinent technical notes, and the technical references of each may be found.

b. In any periodic inspection, the following procedure should be employed:

(1) Inspect the equipment in the order listed in paragraph 32, deter-

mining its inspection and maintenance requirements by referring to the particular paragraphs listed in each case.

(2) Complete the requirements of the particular periodic inspection being made (daily, 25-hour, 50-hour, or any others of lesser periods except the preflight) in the order listed under the inspection requirements in sections VI to XII, inclusive. At the 50-hour inspection period, the inspection and maintenance requirements of the 50-hour, 25-hour, daily, and preflight inspections are performed in the order named. At the 25-hour inspection period, the 25-hour inspection is followed by the daily and preflight inspections. If any of the special inspections discussed in sections VI to XII are due at either of the above-mentioned periods, they also are performed in the order listed under the inspection requirements.

(3) Perform the preflight inspection in accordance with instructions in section V.

c. The following abbreviations are used throughout sections VI to XII:

TM, Technical Manual.

TO, Technical Order.

D, Daily inspection.

PF, Preflight inspection.

AF, Afterflight inspection.

EC, Engine-change inspection.

25-, 50-, 100-, 200-hour, etc., number of flying hours after which inspections are made.

32. Order of inspection.—Functional groups (W. D., A. A. F. Form No. 41B).

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Generator control panels.....	121
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Starters—inertia and direct-cranking types.....	123
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Cowling and fairing.....	56
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Fuel systems.....	128
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SECTION V

PREFLIGHT AND AFTERFLIGHT INSPECTIONS

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Operation of power plants.....	37
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33. General.—*a.* These instructions furnish complete information of a general nature regarding the various inspections and checks to be made and the procedure to be followed in the performance of the preflight inspection of all types of airplanes. The inspection requirements are a compilation of the preflight inspection requirements prescribed for each major item of equipment in sections VI to XII, inclusive, and are specially arranged for convenient use when performing preflight inspections on complete airplanes under service conditions.

b. These instructions are provided for the mechanic who has sufficient training, knowledge, and experience to be able to use them as a guide in performing the inspections and checks prescribed. However, if more detailed information regarding performance of certain inspections and checks is required, it may be found in the pertinent Technical Manuals and Technical Orders referred to in sections VI to XII, inclusive.

34. Before starting engines.—*a. Preflight inspection.*—When the preflight inspection is to be made following the completion of the daily inspection, the majority of the inspections and checks in following *b* below should be made at the time the daily inspection is performed and before the airplane is rolled out of the hangar onto the line. Such a procedure will minimize the time required to perform these two inspections, and thus in many instances will prevent delay

of flights, especially when such inspections reveal the necessity for an unusual amount of maintenance, repairs, or adjustments.

b. Inspection procedure.—The inspection procedure before starting the engine includes the following:

(1) Examine the flight report for completeness and, if it is incomplete, make the necessary entries.

(2) Perform any routine inspections that might be due, and if they cannot be made, see that the proper symbols are entered on the flight report to indicate their omission.

(3) Make a visual inspection of landing, tail, and nose gear for general condition and proper inflation of struts and tires. Ascertain that the landing gear is latched; then remove safety pins (if used and if the airplane is to be flown) and store them in their proper place in the cabin. Do not operate the landing-gear valves or mechanical control handles.

(4) Check the quantities of fuel and oil in the tanks and enter the quantities on Form 1A. Also see that fuel-tank gages correctly indicate the quantities of fuel in tanks. This check must be made at the time of the preflight inspection, since checks made on a previous day cannot be considered part of this inspection.

(5) Ascertain that fuel- and oil-tank caps are properly secured. Drain and resafety all accessible fuel-tank drains and system strainers, and see that all oil-drain cocks and plugs are properly safetied.

(6) If liquid-cooled engines are being used, see that the cooling systems are filled with the correct fluid to their proper levels and that radiator-filler caps and cooling-system drain plugs are properly secured.

(7) Check CO₂ cylinders for evidence of gas discharge.

(8) See that all cowlings are properly installed and fastened.

(9) See that the starter hand crank is in its proper place.

(10) Check windshields and cockpit enclosures for cleanliness and see that cockpit sliding hoods open, close, and latch properly.

(11) Check for presence of blind flying hoods, if used, and proper latch operation.

(12) See that there is nothing in any of the cockpits which will interfere with the airplane or engine controls, and that the required sandbags or other ballast are in place and properly secured. Check quantity of drinking cups, drinking-water supply, and steam-heater water supply. Check cleanliness of toilets and adequacy of paper. Inspect safety belts.

(13) See that the airplane mooring kit is complete and properly stowed in the airplane.

(14) See that a copy of TO 00-20A and the operation and service

sections of the basic Technical Orders pertaining to the particular aircraft and engine involved, with their supplements and amendments, are in the data case of the airplane.

(15) Check for proper installation and condition of cockpit equipment, such as barometric-pressure card, pencil, flashlight, etc., in accordance with applicable engineering memoranda.

(16) See that "Take-off, flight, and landing instructions" are posted in pilot's cockpit.

(17) See that a complete set of "Radio facility data" is placed in the map case in the cockpit.

(18) See that a set of "Operations instructions" data sheets is pasted or otherwise securely fastened inside the back cover of the Flight Reports pad, and that the pad is placed in its holder in the pilot's cockpit.

(19) Before flights involving the use of oxygen, check condition and completeness of oxygen equipment. Check pressure in cylinders and test for leaks. Cylinder valves on cylinders not accessible during flight are turned on before taking off and are closed at completion of flight.

(20) If propeller anti-icer equipment is being used, check fluid in reservoir to insure sufficient supply for operating during flight.

(21) If propeller spinner is used, see that it is clean and coated with de-icer oil.

(22) If the airplane is equipped with an automatic pilot (Type A-2, A-3, or A-4), check for proper oil level in the sump of this system. Fluid, hydraulic, petroleum-base, Specification No. 3580, or Specification No. AN-VV-O-366A, should be used if refilling is necessary.

(23) See that the following instruments register zero, plus or minus their maximum allowable tolerances:

(a) Fuel-pressure gages.

(b) Oil-pressure gages.

(c) Suction gages.

(d) Tachometers.

(24) Check readings on thermometers for consistency with atmospheric conditions.

(25) Set pointers on altimeters to "zero" or to surveyed elevation of landing field, depending upon local instructions.

(26) Check reading on manifold-pressure gages against pressure indication of the altimeter. (Maximum allowable error is 0.4 inch in mercury (Hg).)

(27) Check pointer on rate-of-climb indicator for "zero", and set, if necessary.

(28) Test shutter operation on driftmeter and see that shutter lens and ground glass are clean.

(29) Wind clock, check with operations time, and reset if necessary.

(30) Check indicator pointer on air-speed indicator for "zero" position or value of wind velocity component in direction of aircraft heading.

(31) Check all instruments for broken, loose, or dirty cover glasses and proper pointer position. Also check for improper functioning of rheostats and lights, and for other visible defects. Particular attention should be given to those instruments marked to indicate proper operating limits.

(32) The fuel-pressure signal light should burn steadily when the ignition switch is turned on with the fuel pressure down and engine idle. Build the pressure above the setting point and lower it slowly until light comes on at the desired setting point within a tolerance of ± 0.25 pound per square inch. If the pressure is not within the allowed tolerance of the particular type of system being tested, make necessary adjustments until the required setting is obtained.

(33) Check fuses, light bulbs, and visible leads in electrical system generally.

(34) See that all inspection doors and covers are secured.

(35) Check operation of brakes.

(36) Inspect air scoops for obstructions.

(37) Check hydraulic-system lines and pressures.

(38) If the engine has been standing for more than 2 hours after being run up, pull propeller through several revolutions in order to pump out accumulations of oil in bottom cylinders. If resistance is met other than from cold oil and compression, reverse turning so as to bring cylinder having oil to a valve opening. If resistance is met in both directions determine the cause.

(39) Check turbo-supercharger bucket wheel for free turning.

(40) Remove air-speed tube protection and check openings for freedom from obstructions. Test heating unit.

(41) See that wheel chocks are in proper position.

(42) If over-water flights are contemplated, see that life rafts are in place.

35. Starting and warming up engines.—Before this operation is performed, maintenance personnel should make certain they are familiar with—

a. Instructions for ground operation of airplane engines.

b. Operation and service instructions sections of airplane and en-

gine basic Technical Orders pertaining to the particular airplane and engine. The procedure is as follows:

(1) See that the wheels of the airplane are blocked and parking brakes, if used, are set on.

(2) Turn on fuel-mixture indicator, if used.

(3) Start the warm-up of engines according to instructions furnished in the operation and service instructions sections of the airplane and engine basic Technical Orders pertaining to the particular airplane and engine. During the engine warming-up period, the engine rpm should not be permitted to exceed one-half the maximum permissible ground rpm until after the engine maintains, without fluctuations, at least two-thirds of the minimum full-power oil pressure specified for the engine, and the oil-temperature gage shows a definite increase in oil temperature, indicating that the oil is circulating properly.

36. While engines are being warmed up.—While the engines are being warmed up in accordance with the foregoing instructions, perform the following inspections, checks, and operations:

a. Open manifold-pressure-gage vent-line cock and allow it to remain open for a few seconds.

b. See that wing flaps, if used, are up in normal take-off position.

c. Set elevator trim tabs in normal take-off position.

d. Check aileron and rudder tabs for normal flight setting.

e. Operate rudder, elevator, and aileron controls to insure that all locking devices are off and that there is no binding or interference with baggage, cargo, or installed equipment.

f. Check position indicators for flaps, landing gear, etc.

g. Check all instrument mounts for excessive vibration and instruments for excessive pointer oscillation.

h. If airplane is equipped with automatic pilot (Type A-2, A-3, or A-4), accomplish the following:

(1) Check vacuum.

(2) Check oil pressure.

(3) Engage automatic pilot and check to see that all three controls operate satisfactorily 5 minutes operation of vacuum pumps.

i. Check functions of de-icer equipment.

j. Check caging device of turn indicator. Test for free spin of vertical gimbal, and test light.

k. If gyro instruments are energized by one or more vacuum pumps, make the following checks with the engine running at 1,000 rpm or more:

(1) Check vacuum with vacuum-control valve in each of the "On" positions, respectively.

(2) Check pointer on bank-and-turn indicators for zero deflection after approximately 5 minutes operation of vacuum pumps.

(3) Check bar and pointer on flight indicators for alinement after approximately 5 minutes operation of vacuum pumps.

37. Operation of power plants.—After the engines have been properly warmed up, perform the following inspections and check—

a. Propellers.—If the propellers are of a controllable type, check their operation in accordance with pertinent technical instructions.

Caution: When checking the operation of controllable-pitch propellers during ground operation, the absolute manifold pressure must not exceed the specified cruising manifold pressure to prevent overheating of the engine during operation with the propeller in the low rpm position. In case the airplane is not equipped with manifold-pressure gages, or when the cruising manifold pressure is not known, the controllable-pitch propellers will be checked at not more than 85 percent of the rpm developed when the throttle is open to the throttle stop.

b. Fuel-pressure gages.—Observe operation of gages with the engines running at different speeds and during operation on the different fuel tanks. The indicated pressure should be within the minimum and maximum amounts specified for the engine and should be steady; that is, there should be no fluctuation, regardless of the particular fuel tank being used or the rpm of the engine.

c. Oil-pressure gages.—Observe indicated pressure at different engine speeds. The readings at idling speed and at maximum ground speed should be within the amounts specified for the engine and should be steady; that is, there should be no fluctuations.

d. Thermometers, cylinder-temperature.—If engines are of the air-cooled type, see that indicated cylinder temperatures are normal.

e. Thermometers, cooling-liquid.—If engines are of the liquid-cooled type, see that temperatures indicated by these instruments are normal for that particular engine.

f. Thermometers, oil.—See that the temperatures indicated by these instruments are normal for the particular engine used.

g. Thermometers, carburetor-mixture.—See that temperatures indicated by these instruments are normal for the particular engine used. Operate carburetor air-heater controls and note whether the temperature of the carburetor mixture is affected in a normal manner. While noting the readings of these thermometers, set carburetor air-heater controls in accordance with operation instructions for the type of engine involved.

h. Manifold-pressure gages.—Check the instrument by opening the

engine throttle, with supercharger off if it is of the turbine type. The indicator needle should move freely.

i. Tachometers.—Note that pointer is fairly steady at indicated speeds and does not oscillate excessively.

j. Engine synchronism indicator.—Turn switch on and check for proper indication.

k. Magneto switches.—(1) With the engine idling, turn the switch momentarily to the "Off" position. If the engine does not entirely cease firing, defective functioning of the switch or its connections is indicated. For this test, the engine must not be excessively hot and the period during which both switches are "Off" must be brief, so that the engine does not slow down too much.

(2) Check each engine for smooth operation and normal rpm during operation on each magneto. During this check, the cruising manifold pressure must not be exceeded and the propeller, if of the controllable-pitch type, will be set in the high rpm position. If the airplane is not equipped with manifold-pressure gages, the test will be made at not more than 85 percent of rpm developed when throttle is opened to the throttle stop. If the airplane has no throttle stop and no manifold-pressure gage, the ignition will be checked with throttle open to such position as to cause the engine to turn not more than 85 percent of the full throttle rpm.

l. Ammeters.—(1) With the main line switch "Off," check pointer for zero.

(2) With main line switch "On" and engine running at cruising speed, make certain that the ammeter shows normal charge and that the pointer is steady, that is, does not fluctuate.

m. Voltmeters.—(1) With main line switch "Off" and engine running at cruising speed, note voltmeter reading. The pointer should show a voltage between 14.2 and 14.3 for a 12-volt battery installation and between 28.4 and 28.6 for a 24-volt battery installation.

(2) With main line switch "On," determine voltage at which the current cut-out relay closes the circuit between the battery and generator by slowly opening and closing the throttle and watching the voltmeter. The current cut-out points should close at 13.5 volts in a 12-volt system and 27 volts in a 24-volt system. Closing of points will be indicated by a slight fluctuation of the voltmeter pointer.

n. Idling speed.—Check idling speed of engines, with the throttles in the closed position. Consult the operations section of the basic Technical Order for the engine for exact idling speed.

o. Superchargers, exhaust-driven.—Place waste-gate control in full automatic position and, while operating to maximum allowable ground rpm, check to see that the supercharger waste gate operates

automatically and manifold pressure is held within the specified limits. Check operation of intercooler shutters.

p. Engine controls.—See that the following engine controls operate smoothly and are properly adjusted for full range of control and to prevent creeping:

- (1) Throttles.
- (2) Mixture controls.
- (3) Carburetor-air heat controls.
- (4) Radiator shutters, if used.
- (5) Oil-cooler shutters, if used.
- (6) Engine-cowl flaps, if used.
- (7) Supercharger controls, if used.

q. Cockpit-heater control.—Check cockpit-heater control, if used, for proper operation.

r. Air-compressor units.—Check air-compressor units for proper operation.

s. Dynamotors and alternators.—Check dynamotors and alternators for satisfactory operation.

38. Turning airplane over to pilot.—*a.* Ascertain that all auxiliary equipment, such as communications, gunnery, bombing, and photography equipment, has been given all required inspections and maintenance by specialists charged with this work, and that Form 1A has been filled out and shows the exact status of the airplane.

b. When the airplane is destined for a cross-country flight, see that W. D., A. A. F. Form 23 (Clearance for Aircraft) is executed, signed, and properly disposed of in accordance with Army Air Forces Regulation 15-23.

c. Assist the pilot and passengers, if any, in storing any luggage which they are authorized to carry; assist pilot in attaining a more thorough knowledge concerning the location, operation, and functioning of engine controls, flight controls, etc., when requested to do so.

d. See that cover has been removed from the airspeed tube.

e. Pull airplane-wheel chocks when signaled to do so by the pilot.

f. When the airplane takes off, notify the operations office of the exact time of departure.

39. Afterflight inspection.—*a.* On receiving the airplane from the pilot, examine Form 1A to determine the condition of the airplane as reported by the pilot in the "Remarks" (pilots and mechanics) section. Make the inspection necessary to verify the condition as reported by the pilot, if he has listed a defect, since he may have reported a condition which renders the airplane unsafe for further flight.

b. See that specialists who are charged with inspection and maintenance of auxiliary equipment perform necessary servicing and inspection.

tion of the bombardment, gunnery, chemical, communication, photographic, and navigation equipment.

c. Also perform the following:

(1) Service fuel tanks, engine-oil tanks, turbo-supercharger oil tanks, hydraulic-system fluid tanks, and oxygen tanks, if necessary.

(2) Replace airspeed tube cover.

(3) Check windshield and canopy for condition and cleanliness.

(4) Service toilet equipment.

(5) If oxygen masks or mouthpieces have been used, clean and sterilize.

(6) Remove sufficient engine cowling to check for fuel or oil leaks and failure of any wires, connections, attachments of exhaust pipes and collectors, etc. Check operation of turbo-supercharger waste gate, if used.

(7) Check other inspection requirements for specific equipment as listed in sections VI to XII, inclusive.

SECTION VI

INSPECTION OF STRUCTURES

	Paragraph
Casing (tires and tubes)	40
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Wheel bearings	42
Wheel brakes (Bendix)	43
Wheel brakes (Hayes)	44
Wheel brakes, multiple-disk (Goodyear)	45
Landing gear	46
Tail or nose gear	47
Flight control surfaces	48
Flight control mechanism	49
Wings	50
Fuselage, hulls, and floats	51
Empennage	52
Bonding	53
Wing struts and bracing	54
Cockpits and cabins	55
Cowling and fairing	56
Engine mounts and nacelles	57

40. Casing (tires and tubes) (columns 36 and 38).—*a. References.*—TM 1-410; TO 04-10-1, 04-10-2, and 04-10-2B.

b. Inspection requirements.

	Period			
	D	25	50	Others
(1) Remove tires on all amphibian and heavy bombardment airplanes for internal inspection.	-----	-----	X	
(2) Inspect casing for—				
(a) ¹ Tread wear exposing fabric carcass	-----	-----	X	
(b) External breaks, cuts, blisters, or other visible damage.	-----	-----	X	
(c) Snugness of fit of valve stem when casing is mounted on wheel.	-----	-----	X	
(3) ² Inspect visible portion of wheel rim for evidence of excessive corrosion or damage to wheel rim, and remove and inspect casing if a defect is found.	-----	-----	X	
(4) ³ Inspect tires for proper inflation	X	-----	-----	

¹ Tires subjected to abnormal usage, or known to have struck large stones or other damaging objects, are to be removed and inspected when deemed necessary by local engineering officer.

² Remove and inspect landing and tail-wheel tires at each depot inspection and repair of aircraft.

³ For amount of inflation, consult basic Technical Order on the airplane concerned.

41. Landing, tail, or nose wheels (column 38).—a. References.—TM 1-410; TO 03-25A-3, 03-25A-4, 03-25A-5, 03-25A-7, 03-25A-9, 03-25C-6, 03-25D-1, 03-25A-6, and 03-25B-1.

b. Inspection requirements.

	Period			
	D	25	50	Others
(1) Remove tail or nose wheel and check—				
(a) Bearing cups for scores, corrosion, and pits.	-----	-----	-----	200 hours.
(b) Entire assembly for cracks in wheel castings, corrosion, condition of protective coating, dents in rims or disks, and loose wheel rivets.	-----	-----	-----	200 hours.
(c) Grease retainers for excessive wear, distortion, and grease-soaked condition.	-----	-----	-----	200 hours.
(2) Remove landing wheels and check—				
(a) Brake drums for cracks, scores, and pits.	-----	-----	-----	100 hours.
(b) Bearing cups for scores, corrosion, and pits.	-----	-----	-----	100 hours.
(c) Grease retainers for excessive wear, distortion, and grease-soaked condition.	-----	-----	-----	100 hours.
(d) Entire assembly for cracks in wheel castings, corrosion, condition of protective coating, dents in rim disks, loose wheel rivets, bolts, nuts, studs, safety wire, and distorted reinforcing ribs.	-----	X	-----	
(3) Check wheels for—				
(a) ¹ Adjustment and excessive wear between wheel bushing and axle.	-----	-----	X	

¹ Plain-bearing type.

	Period			
	D	25	50	Others
(b) ² Adjustment and excessive side play and shake.	-----	-----	X	
(c) Valve-stem washers for snug fit on wheel.	-----	-----	X	
(4) Check tail or nose wheels for—				
(a) Cracks, breaks, bends, and distorted flanges.	-----	X	-----	
(b) Condition of grease retainer on inboard bearing.	-----	X	-----	
(c) Signs of chipping, wearing through or scraping off of protective coating.	-----	X	-----	
(5) Check wheels for—				
(a) Bent or distorted rims	-----	X	-----	
(b) Security of retaining nuts, bolts, cotter pins and lock rings.	X	-----	-----	
(c) Freedom from mud, grass, etc.	X	-----	-----	

² Roller-bearing type.

42. Wheel bearings (column 38).—a. References.—TM 1-410; TO 03-25A-1, 29-1-3, and 06-10-4.

b. Inspection requirements.

	Period			
	D	25	50	Others
(1) ¹ Clean, lubricate, and inspect bearings for roughness and corrosion of races, pitted cups, out-of-round, pitted, or corroded rollers—				
(a) Landing-gear wheels	-----	-----	-----	100 hours.
(b) Tail wheels	-----	-----	-----	200 hours.
(2) ² Check plain bearings for proper clearance between bushing and axle.	-----	-----	X	

¹ For proper grade of grease, see pertinent Technical Order.

² Plain bearings should not be oiled or greased.

43. Wheel brakes (Bendix) (column 38).—a. References.—TM 1-410; TO 03-25C-3, 03-25C-7, and 03-25-1.

b. Inspection requirements.

	Period			
	D	25	50	Others
(1) ¹ Remove wheel brakes for disassembly and overhaul.	-----	-----	-----	See note.
(2) Remove master cylinder for disassembly and inspection.	-----	-----	-----	500 hours.

¹ Brakes will be completely disassembled and overhauled upon receipt of the airplane for "complete depot reconditioning."

	Period			
	D	25	50	Others
(3) Check brakes (with wheels removed) for—				
(a) Evidence of corrosion.....	-----	-----	-----	100 hours.
(b) ² Brake lining for evidence of oil or grease.	-----	-----	-----	100 hours.
(c) ³ Loose rivets and cracked lining.....	-----	-----	-----	100 hours.
(d) Cover plate for cracks, dents, worn spots, corrosion, presence of rubber grommets at inlet fitting hole and at eccentric opening.	-----	-----	-----	100 hours.
(e) Examine torque spider for cracks and distortion.	-----	-----	-----	100 hours.
(f) Examine starwheel adjustment screw for bent or worn condition.	-----	-----	-----	100 hours.
(g) Inspect all shoe hold-down pins for alignment and security.	-----	-----	-----	100 hours.
(h) Examine shoe eccentrics for broken, cracked or distorted condition.	-----	-----	-----	100 hours.
(i) Examine all brake springs for breakage, distortion, security of attachment and initial tension.	-----	-----	-----	100 hours.
(j) ⁴ Check shoe actuating mechanism for worn, distorted or broken parts.	-----	-----	-----	100 hours.
(k) Inspect entire assembly for presence of grease, oil, grit, etc.	-----	-----	-----	100 hours.
(l) ⁵ Inspect hydraulic actuating cylinder for evidence of fluid leakage.	-----	-----	-----	100 hours.
(4) Inspect master cylinder for alinement and tightness of fittings.	-----	-----	-----	100 hours.
(5) Inspect master cylinder for fluid level.....	-----	-----	X	
(6) Inspect pedal linkage for condition and security of attachment.	-----	X	-----	
(7) ⁶ Check adjustment and alinement of cable or rod.	X	-----	-----	
(8) Check hydraulic lines and connections for—				
(a) Deterioration of flexible connections.....	-----	X	-----	
(b) Leaks.....	-----	X	-----	
(c) Kinks.....	-----	X	-----	
(d) Twisted or damaged piping and connections.	-----	X	-----	
(e) Proper code marking.....	-----	X	-----	
(f) Entrapped air.....	-----	X	-----	
(9) Inspect torque flange mounting bolts for security.	X	-----	-----	
(10) Inspect dust cover for cracks, dents and distortion.	X	-----	-----	
(11) Inspect hydraulic-inlet connecting bolt and fluid lines for evidence of leakage.	X	-----	-----	
(12) Inspect brake pedal for freedom of operation.	PF	-----	-----	
(13) Check operation of brakes and brake controls.	PF	-----	-----	

² Surface oil or grease may be removed with a high-grade unleaded gasoline.

³ If lining shows crack at more than one rivet hold in any row of rivets or at end of shoe, brake will be replaced.

⁴ On all mechanical-type brakes.

⁵ If leakage occurs, remove and replace brake.

⁶ Angle between actuating rod or cable should not be over 80° with brake fully applied.

44. Wheel brakes (Hayes) (column 38).—a. References.—TM 1-410; TO 03-25B-2, 03-25B-6, and 03-25-1.

b. Inspection requirements.

	Period			
	D	25	50	Others
(1) ¹ Remove brakes and master cylinders for complete disassembly and overhaul.	-----	-----	-----	500 hours.
(2) Check brake mechanism (with wheel removed) for—				
(a) Corrosion and broken or distorted parts.	-----	-----	-----	100 hours.
(b) Inspect mechanical and hydraulic brakes for cracked or worn linings and for loose rivets.	-----	-----	-----	100 hours.
(c) ² Inspect to see that grease from the inboard wheel bearing or fluid from the brake cylinder has not come in contact with the lining.	-----	-----	-----	100 hours.
(d) ³ Inspect expander tube brake for broken lining, condition of tube, etc.	-----	-----	-----	100 hours.
(e) Inspect for uneven wear of lining.	-----	-----	-----	100 hours.
(f) Inspect for security of nuts, bolts, and cotter pins.	-----	-----	-----	
(3) Inspect master cylinder for alinement and tightness of fittings.	-----	-----	-----	100 hours.
(4) Check clearance—				
(a) ⁴ Between brake lining and brake drum and adjust if necessary.	-----	-----	X	
(5) Check fluid level in brake master cylinder.	-----	-----	X	
(6) Visually inspect hydraulic brakes for—				
(a) Seepage of fluid.	-----	X	-----	
(b) Inspect fairings for interference between the backing plate and wheels.	-----	X	-----	
(7) Check hydraulic lines and connections for—				
(a) Leaks.	-----	X	-----	
(b) Kinks.	-----	X	-----	
(c) Proper code marking.	-----	X	-----	
(d) Twisted or damaged piping and connections.	-----	X	-----	
(e) Deterioration of flexible connections.	-----	X	-----	
(f) Entrapped air.	-----	X	-----	
(8) Check operation of brakes and brake controls.	PF	-----	-----	
(9) Bleed brakes and service system if emergency air-brake system was used.	AF	-----	-----	

¹ Disassembly and overhaul shall be done on brakes at depots or stations having thoroughly trained personnel and suitable equipment.

² Surface grease may be washed off with high grade unleaded gasoline.

³ Aerodisc: brake disc will be replaced when combined thickness of disc and lining reaches 0.290 inch.

⁴ There is no adjustment on the expander tube and aerodisc brakes.

45. Wheel brakes, multiple-disk (Goodyear) (column 38).—*a. References.*—TM 1-410; TO 03-25D-2, and 03-25-1.*b. Inspection requirements.*

	Period			
	D	25	50	Others
(1) Remove brakes and master cylinders for complete disassembly and inspection.	-----	-----	-----	500 hours.
(2) Check brake (with wheel removed) for—				
(a) Corrosion and broken or distorted parts.	-----	-----	-----	100 hours.
(b) ¹ Dished, warped or worn disks, worn anchor-bracket keys, excessive disk clearance, and leaking brake fluid.	-----	-----	-----	100 hours.
(c) Blow out any dirt or foreign particles with air.	-----	-----	-----	100 hours.
(d) Security of nuts, bolts, and cotterpins.	-----	-----	-----	100 hours.
(3) ² Check for water seepage.	-----	-----	-----	100 hours.
(4) Inspect master cylinder for alinement and tightness of fittings.	-----	-----	-----	100 hours.
(5) Check disk clearance and adjust if necessary.	-----	-----	X	
(6) Check fluid level in brake master cylinder.	-----	-----	X	
(7) Inspect brake for seepage of fluid.	-----	X	-----	
(8) ³ Replenish grease in seal ring.	-----	X	-----	
(9) Check hydraulic linings for—				
(a) Leaks.	-----	X	-----	
(b) Kinks.	-----	X	-----	
(c) Proper code marking.	-----	X	-----	
(d) Twisted or damaged piping and connections.	-----	X	-----	
(e) Deterioration of flexible connections.	-----	X	-----	
(f) Entrapped air.	-----	X	-----	
(10) Check operation of brake and brake controls.	PF AF	-----	-----	
(11) Bleed brakes and service system if emergency air brake system was used.	AF	-----	-----	

¹ If any of these defects are indicated, completely disassemble and replace worn or broken parts. Thoroughly clean while disassembled for above.² On amphibian aircraft.³ On amphibian aircraft, consult applicable Technical Order.

46. Landing gear (column 37).—a. Reference.—TM 1-410; TO 03-25E-1, 04-5-1, 03-25F-1, 06-1-2, 19-1-18, and 29-1-1.

b. Inspection requirements.

	Period			
	D	25	50	Others
(1) Check condition of—				
(a) Ball-and-socket joints.....			X	
(b) Shock absorber cord if used.....			X	
(2) Check struts for proper fluid level.....			X	
(3) (a) ¹ Test functioning of landing-gear retraction and lowering mechanism.....			X	
(b) Check condition and functioning of valves, ratchets, pumps, pulleys, drums, torque tubes, pressure tubing, flexible connections, couplings, latches, stops, and limit switches. Also check tension of connecting and operating cables.....			X	
(4) Check operation of landing gear position indicators and see that they correctly indicate position of landing gear.....			X	
(5) Check functioning and general condition of warning lights, buzzers, and similar warning devices.....			X	
(6) ² Check shock-absorber units for permanent set or breakage of taxiing springs.....		X		
(7) ³ Check rubber disks for—				
(a) Condition of rubber.....		X		
(b) Disks not stretched or twisted.....		X		
(c) Rubber free of oil.....		X		
(8) Inspect struts, braces, and fittings for—				
(a) Cracks.....		X		
(b) Bends.....		X		
(c) Security and condition of attachment fittings.....		X		
(d) Elongated bolt holes.....		X		
(e) Loose, missing, or unsafetied bolts, nuts, and cotters.....		X		
(9) ⁴ Lubricate as required.....		X		
(10) Check brace wires for proper tension, security, and safetying.....		X		
(11) Inspect for general condition of—				
(a) Struts, braces, and fittings.....		X		
(b) Shock units as indicated by bottoming of struts.....		X		
(c) Evidence of leakage of fluid or pressure in hydraulic or similar units.....	X	X		
(12) ⁵ Check to ascertain that landing gear is latched in down position and remove landing-gear safety lock pins if used.....	PF			
(13) Make visual inspection of landing-gear struts and tires.....	PF			
(14) Insert landing-gear safety lock pins if used.....	AF			

¹ If two or more methods are provided for retracting and lowering the landing gear, test functioning of both.

² On airplanes using edgewater ring shock-absorber springs.

³ Used only on a few very old type airplanes.

⁴ Consult basic Technical Order for lubrication requirements of airplane concerned.

⁵ Lock pins are removed prior to each flight.

47. Tail or nose gear (column 36).—a. References.—TM 1-410; TO 03-25E-1 and 03-25E-2.

b. Inspection requirements.

	Period			
	D	25	50	Others
(1) Check struts for proper fluid level.	-----	-----	X	
(2) Check entire assembly for—				
(a) Cracks, breaks, or bends	-----	X	-----	
(b) ¹ Weak or broken shock absorber springs	-----	X	-----	
(c) Condition of bearing post	-----	X	-----	
(d) Condition of attachment fittings	-----	X	-----	
(e) Operation of swivel release mechanism	-----	X	-----	
(3) ² Lubricate as required	-----	X	-----	
(4) ³ Check for condition of shock unit	X	-----	-----	
(5) Check for freedom from mud, grass, etc.	X	-----	-----	
(6) Check for worn or loose shoes where tail skid is used.	X	-----	-----	
(7) Make visual inspection of tail or nose struts and tires.	PF	-----	-----	
(8) Verify that tow lock pin is engaged, if used.	PF	-----	-----	

¹ Where shock-absorber springs are used.

² Consult basic Technical Order for particular airplane.

³ With the supporting tail in proper position, visually examine the air-oil shock-absorber strut for evidence of leakage of fluid or loss of pressure.

48. Flight control surfaces (column 33).—a. References.—TM 1-410; TO 01-1-12 and 01-1-29.

b. Inspection requirements.

	Period			
	D	25	50	Others
(1) Check horns and hinges for—				
(a) Bends and breaks	-----	X	-----	
(b) Security of attachments	-----	X	-----	
(c) Loose hinge pins and safetying	-----	X	-----	
(2) Check braces and wires for—				
(a) Proper tension	-----	X	-----	
(b) General condition	-----	X	-----	
(c) Security of attachment and safetying	-----	X	-----	
(3) Check ailerons, elevators, rudders, landing flaps, and tabs for—				
(a) Free and full movement	-----	X	-----	
(b) Warping	-----	X	-----	
(c) Broken ribs	-----	X	-----	
(d) ¹ Condition of covering	-----	X	-----	
(e) Condition of grommet holes on fabric-covered airfoils.	-----	X	-----	
(4) Check all surfaces for—				
(a) Holes or other visible damage	X, AF	-----	-----	
(b) General condition	X	-----	-----	
(5) ² Check all control surfaces for security of attachment of hinges, brackets, control horns, surfaces to torque tubes, etc.	PF	-----	-----	
(6) Remove or disengage all control surface locks.	PF	-----	-----	
(7) Apply surface control locks	AF	-----	-----	

¹ If metal covering is used, check for loose rivets and tears around rivets.

² When control surfaces are moved violently by wind or propeller blast during taxiing or after windy conditions while airplane is parked.

49. Flight control mechanism (column 32).—a. References.—
 TM 1-410; TO 01-1-9, 01-1-26, 01-1-29, and 01-1-57.

b. Inspection requirements.

	Period			
	D	25	50	Others
(1) ¹ Check for proper tension of control cables.	-----	-----	-----	100 hours.
(2) ² Clean and treat all cables with rust-preventive compound.	-----	-----	X	
(3) Check rudder bar and pedal assembly, stick and wheel control assembly, and tab and landing-flap mechanism for—	-----	-----	-----	
(a) Condition and functioning of parts-----	-----	X	-----	
(b) Cleanliness and condition of post bearings and pedal bearings.	-----	X	-----	
(c) Position of control surfaces relative to position of control stick and pedals, and correct position of flaps and flettners on cockpit indicators.	-----	X	-----	
(d) Security of control sticks in sockets-----	-----	X	-----	
(e) Free and full movement of all control surfaces.	-----	X	-----	
(4) Check for—	-----	-----	-----	
(a) Condition of cables, chains, rods, turn buckles, pulleys, brackets, fair-leads, guides, attachment fittings, bonding, etc.	-----	X	-----	
(b) Lost motion-----	-----	X	-----	
(c) Security of attachment and proper safetying.	-----	X	-----	
(5) Check landing flap hydraulic operating mechanism for—	-----	-----	-----	
(a) Leaks-----	-----	X	-----	
(b) Kinked or damaged pipes or connections.	-----	X	-----	
(c) Operation-----	-----	X	-----	
(6) ³ Lubricate as required-----	-----	X	-----	
(7) (a) Check for freedom of operation-----	PF	-----	-----	
(b) Check wing flaps and trim tabs for normal take-off position.	PF	-----	-----	

¹ Tension will also be checked at the first 25-hour inspection.

² Rust-preventive compound, Specification No. 2-82. In desert or sandy areas clean cables at pulleys and fair-leads and do not lubricate.

³ Consult basic Technical Order for particular airplane being inspected.

50. Wings (column 34).—*a. References.*—TM 1-410; TO 01-1-3; 01-1-12, 01-1-18, 04-1-1, and 07-1-1.

b. Inspection requirements.

	Period			
	D	25	50	Others
(1) Check wings and center section for—				
(a) Loose rivets, or rivets pulling through metal.	-----	-----	X	
(b) Broken ribs	-----	-----	X	
(c) Open grommet drains	-----	-----	X	
(d) Tautness of internal brace rods	-----	-----	X	
(e) Condition of aircraft markings and insignia.	-----	-----	X	
(f) Corrosion, especially on the inside	-----	-----	X	
(g) Condition of walkways	-----	-----	X	
(2) Check slots for free and full movement.	-----	-----	X	
(3) ¹ Lubricate where necessary	-----	-----	X	
(4) Check wing terminals for—				
(a) Security of attachment	-----	-----	X	
(b) Cracks	-----	-----	X	
(c) Elongated bolt holes	-----	-----	X	
(5) Check flotation compartments by removing drain plugs to allow any condensation to drain out.	-----	-----	X	
(6) Check general condition of—				
(a) Fabric or metal covering	-----	-----	X	
(b) Ribs, as indicated by displacement of covering.	X	-----	-----	
(c) Slots	X	-----	-----	

¹ Consult basic Technical Order for service instructions of airplane concerned.

51. Fuselage, hulls, and floats (column 40).—*a. References.*—TM 1-410; TO 01-1-2, 01-1-3, and 07-1-1.

b. Inspection requirements.

	Period			
	D	25	50	Others
(1) Check all accessible parts of exterior and interior of fuselage, hulls, and floats for—				
(a) Bent longerons and braces	-----	-----	X	
(b) Cracks in tubing	-----	-----	X	
(c) Loose members, bolts, or rivets	-----	-----	X	
(d) Proper attachment of inspection doors	-----	-----	X	
(e) Condition of protective coating	-----	-----	X	
(f) Condition of identification markings	-----	-----	X	
(g) Loose bonding	-----	-----	X	
(2) Flush, wash, and grease exposed metal parts of amphibians after use in salt water.	X	-----	-----	
(3) Check for—				
(a) Tears or cuts in fabric or metal covering.	X	-----	-----	
(b) Broken structural members as evidenced by distortion.	X	-----	-----	
(c) Loose objects likely to foul controls	X	-----	-----	
(d) Evidence of leaks	X	-----	-----	
(e) Condition of protective coating	X	-----	-----	

52. Empennage (column 34).—*a. Reference.*—TM 1-410; TO 01-1-3, 01-1-12, and 04-1-1.

b. Inspection requirements.

	Period			
	D	25	50	Others
(1) Check surfaces for—				
(a) Loose rivets.....	-----	-----	X	
(b) Distortion.....	-----	-----	X	
(c) Protective coating.....	-----	-----	X	
(2) Check all braces, wires, and attachment fittings for—				
(a) Security of attachment and safetying.....	-----	-----	X	
(b) Cracks in fittings.....	-----	-----	X	
(c) Elongated bolt holes.....	-----	-----	X	
(d) Nicks or corrosion on surface of tie rods.....	-----	-----	X	
(3) Check general condition of—				
(a) Fabric or metal covering.....	X	-----	-----	
(b) Ribs.....	X	-----	-----	
(c) Security of attachment and proper tension of bracing.....	-----	-----	X	

53. Bonding (column 33).—*a. References.*—TM 1-410; TO 08-5-1.

b. Inspection requirements.

	Period			
	D	25	50	Others
¹ Check for proper bonding and condition of bonding braid and connections.....	-----	X	-----	

¹ All bonding will be checked at regular periodic inspections of the equipment involved.

54. Wing struts and bracing (column 34).—*a. References.*—TM 1-410; TO 04-1-1.

b. Inspection requirements.

	Period			
	D	25	50	Others
(1) Check for—				
(a) Bowed struts and brace tubes.....	-----	-----	X	
(b) ¹ Proper tension of cables and stream-line wires.....	-----	-----	X	
(c) Cracks.....	-----	-----	X	
(d) Condition and security of all bolts, nuts, fittings, turnbuckles, and safetying devices.....	-----	-----	X	
(2) Check for general condition, security of attachment, proper alinement, and tension.....	X	-----	-----	

¹ Use tensiometer when prescribed for particular airplane models.

55. Cockpits and cabins (column 31).—*a. References.*—TM 1-410; TO 01-1-1, 01-1-8, 01-1-109, and 03-1-2.

b. Inspection requirements.

	Period			
	D	25	50	Others
(1) Check seats for—				
(a) Condition and functioning of adjusting mechanism.	-----	X	-----	
(b) Proper condition of entire assembly	-----	X	-----	
(c) Security of attachment and fittings	-----	X	-----	
(2) Check safety belts for—				
(a) Proper installation	-----	X	-----	
(b) Condition and functioning of belt catch on locking device.	-----	X	-----	
(c) Condition and functioning of adjusting device.	-----	X	-----	
(d) Condition of fabric, leather, metal parts, cables, and fittings.	-----	X	-----	
(e) Last date weight tested	-----	X	-----	
(3) Check ventilators for condition, security of attachments, and functioning of controls.	-----	X	-----	
(4) Check cockpit and cabin heaters for—				
(a) Functioning of controls	-----	X	-----	
(b) Condition of manifolds, valves, and control mechanism.	-----	X	-----	
(5) Check sliding enclosures, turrets, canopies, and windshields for—				
(a) Functioning of adjusting, locking, and releasing mechanism.	-----	X	-----	
(b) Condition of frames, slides, tracks, guides, cables, pulleys, rollers, and adjusting, locking, and release mechanism.	-----	X	-----	
(c) Security of attachment and safetying	-----	X	-----	
(d) ¹ Condition of emergency doors and operating mechanism.	-----	X	-----	
(6) Check sliding enclosures, turrets, canopies, hoods, and windshields for—				
(a) Cleanliness and condition of transparent panels.	X-AF	-----	-----	
(b) Condition and operating of sliding or adjustable types.	X	-----	-----	
(7) Check cockpits and cabins for—				
(a) Cleanliness	X	-----	-----	
(b) Condition of heating system	X	-----	-----	
(c) Condition of safety belts and seat-adjusting controls.	X	-----	-----	
(d) Toilet disinfectant and paper supply	X, AF	-----	-----	
(8) Check cockpits and cabins for—				
(a) Clean windows and windshields	PF	-----	-----	
(b) Proper storage of ballast	PF	-----	-----	
(c) Addition of water to heating system	PF	-----	-----	
(d) Stowage of bilge pumps, if furnished for overwater flights.	PF	-----	-----	
(e) Presence of blind-flying hoods and security of catches, if used.	PF	-----	-----	
(f) Proper installation and condition of	PF	-----	-----	

¹ Certain types of cockpit hoods are designed to be entirely released from the airplane while in flight in case of emergency. Such hoods should be checked to insure their proper release.

	Period			
	D	25	50	Others
cockpit equipment, such as pencils, flashlight, etc., in accordance with applicable engineering memoranda.				
(g) Drain steam-heating system if airplane is to remain idle in freezing weather.	AF	----	----	
(h) Install canvas protective cockpit covers.	AF	----	----	

56. Cowling and fairing (column 29).—a. References.—TM 1-410; TO 01-1-10.

b. Inspection requirements.

	Period			
	D	25	50	Others
(1) Check for cracks, defective fasteners, and condition of padding and protective coating.	-----	-----	X	
(2) Check cowling support cups and brackets for condition and security of attachment.	-----	-----	X	
(3) Check for general condition, dents, bends, and security of attachments.	D	-----	-----	
(4) Check for security of all cowling, doors, and covers.	PF	-----	-----	
(5) Remove sufficient cowling to check for—				
(a) Fuel and oil leaks within the engine nacelles.	AF	-----	-----	
(b) Failure of wires, lines, and connections.	AF	-----	-----	
(c) Attachment of exhaust pipes, collectors, etc.	AF	-----	-----	

57. Engine mounts and nacelles (column 29).—a. References.—TM 1-410; TO 01-1-22 and 01-1-58.

b. Inspection requirements.

	Period			
	D	25	50	Others
(1) Inspect entire assembly for—				
(a) Cracks, particularly at welds.	-----	-----	X	
(b) Tightness of mounting clamps and bolts.	-----	-----	X	
(c) Bent or broken structural members.	-----	-----	X	
(d) Proper condition of protective coating.	-----	-----	X	
(2) ¹ Inspect for proper condition of engine mount vibration absorbers.	-----	-----	X	

¹ Replace at engine change if evidence of excessive wear is noted.

SECTION VII

INSPECTION OF PROPELLERS

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58. Ground-adjustable propeller (column 28).—a. References.—TM 1-412; TO 03-20-1, 03-20-5, 03-20-8, and 03-20-A1.

b. Inspection requirements.

	Period			
	D	25	50	Others
(1) ¹ General inspection and overhaul.....				EC or 1,400 hours.
(2) ² Thoroughly inspect the hub, spinner, and the leading edge, trailing edge, and tip portions of blades for cracks or other defects.			X	
(3) Inspect anti-glare and painted markings on blades for deterioration.			X	
(4) Check retaining nut and clamp-ring bolts for looseness.			X	
(5) Inspect hub for looseness on shaft, and blades for looseness in hub.	X			
(6) Inspect all bolts, nuts, pins, and screws for proper safetying.	X			
(7) ³ Coat the outside surfaces of all hubs and aluminum-alloy blades with clean engine oil. Coat steel blades with approved rust-preventive compound.	X			
(8) Inspect spinner, hub and blades for cracks, nicks, and other damage.	X			
(9) Check for excessive vibration.....	PF			

¹ At each engine change, within allowable propeller operating time, the propeller assembly, if visual inspection warrants, may be reinstalled without overhaul provided the total propeller time since last overhaul plus the maximum possible operating time for the replacement engine will not exceed 1,400 hours.

² Use a magnifying glass for this inspection. Perform local etching (aluminum-alloy blades) if necessary.

³ Painted blades with paint in good condition need not be coated.

59. Lycoming-Smith controllable propeller (column 28).—a. References.—TM 1-412; TO 03-20-1, 03-20-2, 03-20-5, 03-20-8, and 03-20D-1.

b. Inspection requirements.

	Period			
	D	25	50	Others
(1) ¹ General inspection and overhaul.....	-----	-----	-----	EC or 1,100 hours.
(2) Check for sufficient lubricant in hub....	-----	-----	X	
(3) Inspect antiglare and painted markings for deterioration.	-----	-----	X	
(4) Thoroughly check the hub, spinner, and blades for cracks, nicks, or other defects, using a magnifying glass.	-----	-----	X	
(5) Check controls and pitch indicator for security of mounting.	-----	X	-----	
(6) Check retaining nut for looseness.....	-----	X	-----	
(7) Inspect hub for looseness on shaft and blades for looseness in hub.	X	-----	-----	
(8) Inspect all bolts, nuts, pins, and screws for proper safetying.	X	-----	-----	
(9) ² Coat external surfaces of hub and blades with clean engine oil.	X	-----	-----	
(10) Inspect hub and blades for cracks, nicks, etc.	X	-----	-----	
(11) Check range of operation and check for excessive vibration.	PF	-----	-----	

¹ At each engine change, within allowable propeller operation time, the propeller assembly, if visual inspection warrants, may be reinstalled without overhaul provided the total propeller time since last overhaul, plus the maximum possible operating time for the replacement engine will not exceed 1,100 hours.

² Painted blades with paint in good condition need not be coated.

60. Hamilton standard two-position propeller (column 28).—a. References.—TM 1-412; TO 03-20-1, 03-20-2, 03-20-5, 03-20-8, and 03-20CB-2.

b. Inspection requirements.

	Period			
	D	25	50	Others
(1) ¹ General inspection and overhaul.....	-----	-----	-----	EC or 1,400 hours.
(2) ² Carefully examine exterior of spinner and propeller for cracks and other defects.	-----	-----	X	
(3) Inspect painted markings and antiglare for deterioration.	-----	-----	X	
(4) Check controls for security of mounting and free operation.	-----	-----	X	

¹ At each engine change, within allowable propeller operating time, the propeller assembly, if visual inspection warrants, may be reinstalled without overhaul, provided the total propeller time since last overhaul plus the maximum possible operating time for the replacement engine will not exceed 1,400 hours.

² Use magnifying glass for this inspection. Perform local etching if necessary.

	Period			
	D	25	50	Others
(5) ³ Check the counterweight bearing and shaft installation for tightness and proper clearance.			X	
(6) Check piston for looseness.			X	
(7) Lubricate hub spider with approved grease.			X	
(8) Lubricate counterweight bearings with approved grease.		X		
(9) Clean the exposed portion of piston and lubricate with clean engine oil.		X		
(10) Check for oil leaks.	X			
(11) Check hub for looseness on shaft and blades for looseness in hub.	X			
(12) Inspect all bolts, nuts, screws, pins, etc., for tightness and proper safetying.	X			
(13) ⁴ Coat hub and blades with clean engine oil.	X			
(14) Inspect blades and hub for cracks and other defects.	X			
(15) Check range of operation and check for excessive vibration.	PF			

³ Proper clearance of 0.002 to 0.003 inch will be maintained by addition of shims of required thickness. Do not disturb setting of adjusting nuts or alignment of cylinder on the piston when adding shims.

⁴ Painted blades with paint in good condition need not be coated.

61. Hamilton standard constant-speed propeller (column 28).—*a. References.*—TM 1-412; TO 03-20-1, 03-20-2, 03-20-5, 03-20-8, and 03-20CB-2.

b. Inspection requirements.

	Period			
	D	25	50	Others
(1) ¹ General inspection and overhaul.				EC or 1,400 hours.
(2) ² Carefully examine exterior of spinner and propeller for cracks and other defects.			X	
(3) Inspect painted markings and anti-glare for deterioration.			X	
(4) Check propeller and governor controls for security of mounting.			X	
(5) ³ Check counterweight bearing and shaft installation for tightness and proper clearance.			X	
(6) Check piston for looseness.			X	
(7) Lubricate hub spider with approved grease.			X	

¹ At each engine change, within the allowable propeller operating time, the propeller assembly, if visual inspection warrants, may be reinstalled without overhaul, provided the total propeller time since last overhaul plus the maximum possible operating time for the replacement engine will not exceed 1,400 hours.

² Use magnifying glass for this inspection. Perform local etching if necessary.

³ Proper clearance of 0.002 to 0.003 inch will be maintained by addition of shims of required thickness. Do not disturb setting of adjusting nuts or alignment of cylinder on piston when adding shims.

	Period			
	D	25	50	Others
(8) Lubricate counterweight bearings with approved grease.		X		
(9) Clean the exposed portion of the piston, and lubricate with clean engine oil.		X		
(10) Check for oil leaks (propeller barrel, governor base, and head).	X			
(11) Inspect hub for looseness on shaft, blades for looseness in hub.	X			
(12) Inspect all bolts, nuts, screws, pins, etc., for proper safetying (propeller and governor).	X			
(13) ⁴ Coat all external surfaces with clean engine oil.	X			
(14) Inspect blades and hub for cracks and other defects.	X			
(15) Check range of operation and check for excessive vibration.	PF			

⁴ Painted blades with paint in good condition need not be coated.

62. Hamilton standard hydromatic propeller (column 28).—

a. References.—TM 1-412; TO 03-20-1, 03-20-2, 03-20-5, 03-20-8, and 03-20CC-2.

b. Inspection requirements.

	Period			
	D	25	50	Others
(1) ¹ General inspection and overhaul				EC or 1,400 hours.
(2) Check retaining nut for looseness				200 hours.
(3) ² Carefully examine exterior of propeller for cracks and other defects.			X	
(4) Check for deterioration of all painted markings (blades and hub).			X	
(5) Check installation for security of mounting and operation.			X	
(6) Check for oil leakage	X			
(7) Check blades for looseness in hub and hub for looseness on shaft.	X			
(8) Inspect all bolts, nuts, screws, pins, etc., for proper safetying.	X			
(9) ³ Coat all external surfaces of hub and blades with clean engine oil.	X			
(10) Inspect exterior of all parts of propeller for cracks and other defects.	X			
(11) Check range of operation and for excessive vibration.	PF			

¹ At each engine change, within the allowable propeller operating time, the propeller assembly, if visual inspection warrants, may be reinstalled without overhaul provided the total time since last overhaul plus the maximum time for the replacement engine will not exceed 1,400 hours. Any time it is necessary to remove the dome assembly from the propeller, sludge and carbon deposits will be removed when visual inspection indicates it is necessary.

² Use magnifying glass for this inspection. Perform local etching if necessary.

³ Painted blades with paint in good condition need not be coated.

63. Hamilton standard propeller governor (column 28).—a. References.—TM 1-412; TO 03-20-1, 03-20-5, and 02-200A-2.
b. Inspection requirements.

	Period			
	D	25	50	Others
(1) General inspection and overhaul-----	-----	-----	-----	Propeller over- haul.
(2) Check control system and governor for security of mounting. Check for proper safetying of exposed nuts, clevis pins, etc.	-----	-----	X	
(3) Check governor assembly for free movement of drive.	-----	-----	X	
(4) Check for external oil leaks around governor base and head.	X	-----	-----	
(5) Check controls for loose motion-----	X	-----	-----	

64. Hamilton standard electric propeller-governor control (column 28).—a. References.—TM 1-412; TO 03-20-1, 03-20-5, and 03-20-15.

b. Inspection requirements.

	Period			
	D	25	50	Others
(1) General inspection and overhaul-----	-----	-----	-----	EC. 150 hours.
(2) Remove covers of control unit and switch box, and examine for loose or dirty connections, and defective wiring.	-----	-----	-----	
(3) ¹ Remove brush and spring assemblies from control-unit motor, and examine for binding or worn brushes.	-----	-----	-----	150 hours.
(4) ² Wipe brush boxes and binding brushes clean with gasoline-moistened cloth. Replace covers of control unit and switch box.	-----	-----	-----	150 hours.
(5) Check the governor indicating lights for proper operation:	PF	-----	-----	

¹ Worn brushes should be replaced if minimum length is $1\frac{1}{2}$ inch or less, or if before next inspection brushes may wear too short.

² Do not lubricate the switch box. The control unit does not require lubrication between overhauls.

65. Aeroproducts constant-speed propeller (column 28).—a. References.—TM 1-412; TO 03-20-1, 03-20-2, 03-20-5, 03-20-8, and 03-20E-2.

b. Inspection requirements.

	Period			
	D	25	50	Others
(1) General inspection and overhaul-----	-----	-----	-----	EC or 300 hours.
(2) Lubricate blade bearings and gears-----	-----	-----	-----	100 hours.
(3) Clean and inspect the control arm and linkage leading to the cockpit, and coat with clean engine oil.	-----	-----	-----	100 hours.
(4) Check retaining nut for looseness-----	-----	-----	X	
(5) Carefully examine exterior of propeller for cracks and other defects, using a magnifying glass.	-----	-----	X	
(6) Check for deterioration of all painted markings on blades and hub.	-----	-----	X	
(7) Check installation for security of mounting and operation.	-----	-----	X	
(8) Check hub for grease-----	-----	-----	X	
(9) Wipe hub and regulator with oily rag-----	-----	-----	X	
(10) Check oil level in regulator-----	-----	X	-----	
(11) Check blades for looseness in hub and for looseness on shaft.	X	-----	-----	
(12) Inspect all bolts, nuts, screws, pins, etc., for proper safetying.	X	-----	-----	
(13) ¹ Clean the blades and hub, and coat with clean engine oil.	X	-----	-----	
(14) Inspect exterior of all parts of propeller for cracks and other defects.	X	-----	-----	
(15) Check for oil leaks and trace to their sources.	X	-----	-----	
(16) Check range of operation and for excessive vibration.	PF	-----	-----	

¹ Painted blades with paint in good condition need not be coated.

66. Curtiss controllable propellers (column 28).—a. References.—TM 1-412; TO 03-20-1, 03-20-2, 03-20-5, 03-20-8, 03-20-11, and 03-20B-1.

b. Inspection requirements.

	Period			
	D	25	50	Others
(1) General inspection and overhaul of propeller.	-----	-----	-----	EC or 750 hours.
(2) Check for deterioration of painted markings on blades and hub.	-----	-----	X	
(3) Check retaining nut for looseness-----	-----	-----	X	

	Period			
	D	25	50	Others
(4) Remove brush-cap assembly. Inspect slip rings and brushes for wear and cleanliness. Check brushes for frayed or broken leads. Brushes of molded-type holder are inscribed on side with arrow which points toward front of brush. When point of wear of brushes reaches tip of arrow or beyond, brush must be replaced. Brushes of early-type (laminated) holder should extend $\frac{3}{16}$ inch from block. Examine for worn brushes, permanently compressed springs, and dirty brush glides.	-----	-----	X	100 hours.
(5) ¹ <i>Hollow-shaft propellers.</i> —(a) Remove spinner nose and blast shield. Remove outer motor housing and inspect general condition of electric motor (terminals and wire connections, tightness and condition of brush riggings).	-----	-----	-----	
(b) On inside face of motor brushes, measure distance brushes extend from holder. If distance is $\frac{3}{16}$ inch or less, brushes must be replaced. Brushes must slide freely in holders.	-----	-----	-----	
(c) Check the brake for clearance and warpage of the brake plate.	-----	-----	-----	
(6) <i>Four-blade hollow steel propellers.</i> —(a) Remove motor cover. Inspect general condition of electric motor (terminals and wire connections, tightness and condition of brush riggings).	-----	-----	X	
(b) Check inner and outer brake clearances.	-----	-----	-----	
(7) ² <i>Hollow steel and aluminum alloy blade propeller.</i> —(a) Remove motor cover. Inspect general condition of electric motor (terminals and wire connections, tightness and condition of brush riggings).	-----	-----	X	
(b) Check condition of brake and brake clearance.	-----	-----	-----	
(8) Check oil level in speed reducer by rotating filler-plug opening to 20° below horizontal when airplane is at ground angle of 12°; 8° when airplane is leveled. Fill with approved oil.	-----	-----	X	
(9) Check safety switch, selector switch, and feathering switch. The three switches should make positive contact and should be free from looseness and sluggish operation of handles. (Hollow-shaft propellers do not have feathering circuits or switches.)	-----	-----	X	
(10) ³ Lubricate hub with approved grease.	-----	-----	X	

¹ *Hollow-shaft propellers.*—Check oil level by rotating the propeller until the large filler plug, located in the rear housing, is at the highest point. If oil is not at plug opening, completely fill gear assembly to this point.

² *Aluminum-alloy blade propellers.*—Raised edges of scratches or nicks may be dressed off with fine file and sandpaper No. 00.

³ Except hollow-shaft propellers.

	Period			
	D	25	50	Others
(11) Thoroughly clean and visually inspect hub and blades for damage or defects, using magnifying glass. Each suspected scratch should be carefully examined for scratches or cracks. Raised edges of scratches or nicks may be dressed off with handstone and emery cloth.	X	---	---	
(12) Test operation of pitch-changing mechanism by placing selector switches in increase rpm position, then decrease rpm position.	X	---	---	
(13) ⁴ Coat exterior surfaces of hub and blades with clean engine oil.	X	---	---	
(14) Examine blades for looseness in hub and hub for looseness on shaft.	X	---	---	
(15) Inspect all bolts, nuts, screws, pins, etc., for proper safetying.	X	---	---	
(16) ⁵ Inspect for oil leaks.	X	---	---	
(17) Check range of operation (both manually and in automatic control) and for excessive vibration.	PF	---	---	

⁴ Painted blades with paint in good condition need not be coated.

⁵ *Hollow-shaft propellers*.—Should there be any indication that oil has been leaking, the propeller should be completely filled.

67. Curtiss proportional and lubricated-pad governor control systems (column 28).—a. References.—TM 1-412; TO 03-20-15 and 03-20B-2.

b. Inspection requirements.

	Period			
	D	25	50	Others
(1) General inspection and overhaul	---	---	---	Propeller overhaul or 750 hours.
(2) Check governor	---	---	---	100 hours.
(a) <i>Proportional governor</i> .—Remove contact switch-cover. Inspect contacts for tightness and cleanliness. Clean contact assembly and remove any oil in switch compartment. <i>Do not dress or file contact points.</i> Place not more than one drop of light lubricating oil on upper end of shaft which supports the center contact assembly.	---	---	---	
(b) <i>Lubricated-pad governor</i> .—Remove cover from governor. Clean contact assemblies. Clean contact points with crocus cloth or fine sandpaper.	---	---	---	
(3) Partially remove relay from its box and	---	---	---	100 hours.

	Period			
	D	25	50	Others
(a) Inspect for proper mating of contact points and sufficient contact-points pressure. (Contact point is Elkonite.) <i>Do not dress or file.</i> Discoloration and fine pit marks are normal characteristics.				
(b) Make sure armature floats freely on its pivot pin.				
(c) Examine all terminals and wire connections for tightness and cleanliness. Replace relay in box.				
(4) Examine electrical connectors, noting condition of sockets and pins. Coat housing threads with antiseize.	-----	-----	-----	100 hours.
(5) ¹ Inspect governor-control lever to determine that it has at least $\frac{1}{4}$ inch springback from full forward position. <i>Do not adjust stop screw on governor.</i>	-----	-----	-----	
(6) Visually inspect filter (when used) for loose-wire connections. In event of radio interference, condensers should be tested.	-----	-----	-----	100 hours.
(7) Make sure cockpit connections to switches are tight.	-----	-----	-----	100 hours.
(8) Visually inspect condition of all flexible conduit where damage may occur.	-----	X	-----	
(9) Visually inspect condition of control rods or cables in engine nacelle.	-----	X	-----	

¹ These inspections performed daily on lubricated pad governor.

68. Propeller anti-icer systems (column 43).—a. References.—
 TM 1-412; TO 03-35-1, 03-35A-1, 03-35A-3, and 03-35A-5.

b. Inspection requirements.

	Period			
	D	25	50	Others
(1) ¹ General inspection and overhaul.-----	-----	-----	-----	EC.
(2) ² Inspect pump-motor brush and spring assemblies, and the commutator.	-----	-----	X	
(3) Inspect all electrical connections in the system for tightness.	-----	-----	X	
(4) Inspect for security of mounting and for leaks in any connections.	-----	-----	X	
(5) Inspect fluid in reservoir to insure sufficient supply for operation of unit.	PF	-----	-----	

¹ If the anti-icer pump has been installed on the airplane 100 hours or longer since the last engine change, it will normally be overhauled at engine change and at each engine change thereafter.

² *Eclipse diaphragm type.*—Replace brushes if they are $1\frac{1}{2}$ inch or shorter. *Peaco and Eclipse gear type.*—Replace brushes if they are $\frac{1}{4}$ inch or shorter. *Adel.*—Replace brushes if they are $\frac{5}{16}$ inch or shorter.

69. Rubber-covered propeller spinner (column 28).—a. References.—TM 1-412; TO 03-35A-2.

b. Inspection requirements.

	Period			
	D	25	50	Others
Coat with approved oils—				
(1) While in storage				3 months.
(2) On completion of each day's flying	X			
(3) ¹ Prior to first flight each day	PF			

¹ Clean rubber cover of the spinner with cloth moistened with denatured alcohol before applying this oil

SECTION VIII

INSPECTION OF INSTRUMENTS

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- 70. Gage assemblies, fuel, oil, and air-pressure (column 21).—a. References.**—TM 1-413; TO 05-1-17, 05-70-2, and 05-1-1.
- b. Inspection requirements.**

	Period			
	D	25	50	Others
(1) ¹ General inspection and overhaul.....	-----	-----	-----	See note.
(2) Check instruments and lines for security of mounting.	-----	-----	X	
(3) Check all lines and connections for proper anchorage, flexibility, and leaks.	-----	-----	X	
(4) Check dial and pointer for luminosity.....	-----	-----	X	
(5) Check for correct and discernible operations markings.	-----	-----	X	
(6) Check cover glasses for looseness and cracks.	X	-----	-----	
(7) ² Check for pointer tolerance.....	X	-----	-----	
(8) Check for light on types having individual lights.	X	-----	-----	
(9) Check for excessive pointer oscillation.....	PF	-----	-----	
(10) ³ Check for reading consistent with airplane requirements.	PF	-----	-----	

¹ Pressure gages are removed for detailed inspection and repairs at depots upon receiving the airplane for "Complete Depot Reconditioning." (TO 00-25-4.)

² Maximum allowable tolerance at zero for various gages are:

Fuel pressure, ± 0.3 pound per square inch.

Oil pressure, ± 5 pounds.

Oil pressure, automatic pilot, ± 5 pounds.

Landing gage, hydraulic pressure, 40 pounds.

Air pressure, de-icing, ± 0.3 pound.

Air pressure, brakes, ± 5 pounds.

³ During cold weather, fill oil pressure gage line with light oil to prevent sluggishness. (TO 05-40-10.)

- 71. Gage assembly, suction (column 44).—a. References.**—TM 1-413; TO 05-80-1, 05-1-17, and 05-1-1.

b. Inspection requirements.

	Period			
	D	25	50	Others
(1) ¹ General inspection and overhaul.....	-----	-----	-----	See note.
(2) Check luminosity of dial and pointer.....	-----	-----	X	
(3) Check all lines and connections for security, anchorage, leaks, flexibility, and deterioration.	-----	-----	X	
(4) Check cover glass for operation markings.	-----	-----	X	
(5) Check instrument for security of mounting.	-----	-----	X	
(6) ² Check pointer for zero tolerance and looseness.	X	-----	-----	
(7) Check cover glass for looseness and cracks.	X	-----	-----	
(8) Check light on types having individual lights.	X	-----	-----	
(9) Check for indication consistent with instrument requirements.	PF	-----	-----	

¹ Remove instrument for yearly depot inspection in accordance with TO 00-25-4.

² Maximum allowable tolerance at zero: ± 0.1 inch mercury (Hg).

72. Gage assembly, manifold-pressure (column 21).—a. References.—TM 1-413; TO 05-70-1, 05-1-1C, 05-1-1, 05-70D-1, 05-70E-1, 05-1-17, 05-70C-1, and 05-1-6.

b. Inspection requirements.

	Period			
	D	25	50	Others
(1) ¹ General inspection and overhaul	-----	-----	-----	See note.
(2) Check cover glass for operations markings.	-----	-----	X	
(3) ² Check reading with station barometer.	-----	-----	X	
(4) Check luminosity of dial and pointer.	-----	-----	X	
(5) Check instrument for security of mounting.	-----	-----	X	
(6) Check all lines and connections for security, anchorage, leaks, wear, and flexibility.	-----	-----	X	
(7) Check cover glass for looseness and cracks.	X	-----	-----	
(8) Check light on types having individual lights.	X	-----	-----	
(9) Check instrument by accelerating engine (supercharger off). Pointer should move to left.	PF	-----	-----	
(10) Check against barometer (engine not running).	PF	-----	-----	
(11) ³ Drain instrument and check for operation of pointer (engine operating).	PF	-----	-----	
(12) ³ Check instrument for reading consistent with engine output.	PF	-----	-----	

¹ Gage assembly, manifold pressure, is removed at depot for detail inspection and repairs, upon receipt of airplane for "Complete Depot Reconditioning." (TO 00-25-4.)

² If reading differs by more than 0.4 inch of mercury (Hg) from that of station barometer, remove for bench test.

³ With engine at idling speed, open drain for a few seconds. If no drain cock is installed, disconnect line at gage or transmitter and blow out line at each 50-hour inspection period.

73. Unit assembly, engine-gage (column 21).—a. References.—TM 1-413; TO 00-25-4, 05-1-17, 05-75-1, 05-75-2, 05-1-1, 05-40-10, and 05-75-3.

b. Inspection requirements.

	Period			
	D	25	50	Others
(1) ¹ General inspection and overhaul	-----	-----	-----	See note.
(2) Check instruments and lines for security of mounting.	-----	-----	X	
(3) Check all lines and connections for proper anchorage, flexibility, and leaks.	-----	-----	X	
(4) Check dial and pointer for luminosity.	-----	-----	X	
(5) Check for correct and discernible operations markings.	-----	-----	X	

¹ Major repairs are made at authorized repair depots only in accordance with TO 00-25-4.

	Period			
	D	25	50	Others
(6) Check cover glasses for looseness and cracks.	X	---	---	
(7) ² Check for pointer tolerance-----	X	---	---	
(8) Check light on types having individual lights.	X	---	---	
(9) Check for excessive pointer oscillation.	PF	---	---	
(10) ³ Check for reading consistent with engine conditions.	PF	---	---	

¹ Maximum allowable tolerances at zero are:

Fuel-pressure gage, ± 0.2 pound.

Oil-pressure gage, ± 5 pounds.

Thermometer, $\pm 3^{\circ}$ C.

² During cold weather, fill oil-pressure gage line with light oil to prevent sluggishness. (TO 05-40-10.)

74. Thermometer assembly, cylinder-temperature, thermocouple type (column 21).—a. References.—TM 1-413; TO 05-1-17, 05-40-3, 05-1-1, 05-1-16, 05-40-17, and 05-40D-2.

b. Inspection requirements.

	Period			
	D	25	50	Others
(1) ¹ General inspection and overhaul-----	---	---	---	See note.
(2) Check pointer and dial luminosity-----	---	---	X	
(3) ² Check instrument for atmospheric temperature.	---	---	X	
(4) Check leads for condition, anchorage, and for security of connections at terminals.	---	---	X	
(5) Check instrument for security of mounting.	---	---	X	
(6) Check insulation of cables-----	---	---	X	
(7) ³ Check cover glass for operations markings.	---	---	X	
(8) Check cover glass for looseness and cracks.	X	---	---	
(9) Check light on types having individual lights.	X	---	---	
(10) Check for indication consistent with engine temperature.	PF	---	---	

¹ Thermometer assemblies are removed for detailed inspection and repairs at depot upon receiving the airplane for "Complete Depot Reconditioning." (TO 00-25-4.)

² Open circuit and check with standardized mercury thermometer.

³ See TO 05-1-16 for proper identification of thermometer.

75. Thermometer assemblies, electric (column 21).—a. References.—TM 1-413; TO 05-1-17, 05-40-12, 05-40B-1, 05-1-1, 05-40B-3, 05-1-16, and 05-40-5.

b. Inspection requirements.

	Period			
	D	25	50	Others
(1) ¹ General inspection and overhaul.....	-----	-----	-----	See note.
(2) Inspect bulb for proper installation.....	-----	-----	X	
(3) Inspect thermometer indicator for—	-----	-----	-----	
(a) Chipped luminous markings.....	-----	-----	X	
(b) Security of mounting.....	-----	-----	X	
(c) Tightness and condition of connections and leads.....	-----	-----	X	
(4) Interrupt current supply and adjust instrument to its zero position.....	-----	-----	X	
(5) ² Check cover glass for operations markings.....	-----	-----	X	
(6) Check cover glass for looseness and cracks.....	X	-----	-----	
(7) ³ Check mechanical zero and adjust, if necessary.....	X	-----	-----	
(8) Check light on types having individual lights.....	X	-----	-----	
(9) Turn battery switch on and check operation.....	PF	-----	-----	
(10) Inspect for excessive pointer oscillation during engine warm-up.....	PF	-----	-----	

¹ Thermometer assemblies are removed for detailed inspection and repairs at depots, upon receiving the airplane for "Complete Depot Reconditioning." (TO 00-25-4.)

² See TO 05-1-16 for identification of thermometer.

³ Where thermometer has external adjusting screw.

76. Thermometer assembly, free-air, vapor-pressure type (column 44).—a. References.—TM 1-413; TO 05-1-1, 05-1-16, 05-40A-5, 05-1-17, and 05-40-9.

b. Inspection requirements.

	Period			
	D	25	50	Others
(1) ¹ General inspection and overhaul.....	-----	-----	-----	See note.
(2) Check pointer and dial for luminosity.....	-----	-----	X	
(3) Check instrument and dependent units for security of mounting.....	-----	-----	X	
(4) Check capillary for flexibility, sharp bends and kinks and anchorage.....	-----	-----	X	
(5) Check alinement of bulb (if mounted externally).....	-----	-----	X	
(6) ² Check for indication consistent with atmospheric or hangar temperature.....	X	-----	-----	
(7) Check cover glass for looseness and cracks.....	X	-----	-----	
(8) Check light on types having individual lights.....	X	-----	-----	
(9) Check pointer for excessive oscillation.....	PF	-----	-----	

¹ Thermometer assembly is removed for detailed inspection and repair at depot, upon receiving the airplane for "Complete Depot Reconditioning." (TO 00-25-4.)

² See TO 05-1-16 for proper identification of thermometer.

77. Thermometer assembly, oil-and-coolant, vapor-pressure type (column 21).—a. References.—TM 1-413; TO 05-1-16, 05-1-1, 05-1-17, 05-40-4, and 05-40A-1.

b. Inspection requirements.

	Period			
	D	25	50	Others
(1) ¹ General inspection and overhaul.....	-----	-----	-----	See note.
(2) Check pointer and dial for luminosity.....	-----	-----	X	
(3) ² Check cover glass for operations markings.	-----	-----	X	
(4) Check capillary for minimum radius of bends and worn armor at all friction points.	-----	-----	X	
(5) Check instrument and dependent units for security of mounting.	-----	-----	X	
(6) ³ Check indication against free air thermometer.	X	-----	-----	
(7) Check cover glass for looseness and cracks.	X	-----	-----	
(8) Check light on types having individual lights.	X	-----	-----	
(9) Check pointer for excessive oscillation...	PF	-----	-----	

¹ Thermometer assembly is removed for detailed inspection and repair at depot upon receiving the airplane for "Complete Depot Reconditioning." (TO 00-25-4.)

² See TO 05-1-16 for identification of thermometer.

³ Maximum allowable tolerance $\pm 3^{\circ}$ C.

78. Tachometer assembly, mechanical, shaft-driven (column 21).—a. References.—TM 1-413; TO 05-1-26, 05-5C-1, 05-1-1, 05-1-17, and 05-5A-1.

b. Inspection requirements.

	Period			
	D	25	50	Others
(1) ¹ Check drive shaft for excessive wear and lubricate shaft and drive adapters.	-----	-----	-----	EC.
(2) ² General inspection and overhaul.....	-----	-----	-----	See note.
(3) Check drive-shaft housing for breaks, proper installation, bonding, and tightness of retaining nuts.	-----	-----	X	
(4) Check pointer and dial for luminosity.....	-----	-----	X	
(5) Check instrument and dependent units for security of mounting.	-----	-----	X	
(6) Check for discernible operation markings.	-----	-----	X	
(7) ³ Check for tolerance at zero.....	X	-----	-----	
(8) Check for traces of oil on inside face cover.	X	-----	-----	
(9) Check cover glass for looseness and cracks.	X	-----	-----	
(10) Check light on types having individual lights.	X	-----	-----	
(11) Check pointer for erratic reading.....	PF	-----	-----	

¹ Lubricate as directed in TO 05-5A-1.

² Tachometer assembly, mechanical, shaft-driven, is removed for detailed inspection and repair upon receipt of airplane for "Complete Depot Reconditioning." (TO 00-25-4.)

³ Maximum allowable tolerance, ± 15 rpm.

79. Tachometer assembly, electric (column 21).—a. References.—TM 1-413; and TO 05-5B-1, 05-1-1, 05-1-17, 05-5B-2, 05-5D-1, and 05-5E-1.

b. Inspection requirements.

	Period			
	D	25	50	Others
(1) ¹ General inspection and overhaul.....	-----	-----	-----	See note. Engine change.
(2) Lubricate bearings in E-12 tachometer generator.	-----	-----	-----	
(3) ² Inspect tachometer generator commutator for greasy condition. (de types only.)	-----	-----	-----	100 hours.
(4) Check cover glass for operations markings.	-----	-----	X	
(5) Inspect tachometer generator for security of mountings.	-----	-----	X	
(6) Inspect indicator for—				
(a) Chipped luminous markings.....	-----	-----	X	
(b) Security of mountings.....	-----	-----	X	
(7) Check—				
(a) Electrical connections.....	-----	-----	X	
(b) Condition of cable insulation.....	-----	-----	X	
(8) Check cover glass for looseness and cracks.	X	-----	-----	
(9) ³ Check pointer for tolerance at zero....	X	-----	-----	
(10) Check lights on types having individual lights.	X	-----	-----	
(11) Check for reading consistent with engine requirements.	PF	-----	-----	
(12) Check pointer for excessive oscillation.	PF	-----	-----	
(13) ⁴ Tap instrument panel lightly and observe pointer movement for friction.	PF	-----	-----	

¹ Every 12 months tachometer indicators and generators will be forwarded to depot for recalibration (TO 00-25-4.)

² When used in connection with type A-4 synchronism indicator, remove generators and indicator and check for matched generators in accordance with TO 05-5-3.

³ Maximum allowable tolerance, ± 30 rpm.

⁴ On types E-9, E-13, and E-14.

80. Indicator assembly, engine-synchronism (column 21).—**a. References.**— TM 1-413; TO 05-5-3, 05-1-1, and 05-1-17.**b. Inspection requirements.**

	Period			
	D	25	50	Others
(1) ¹ General inspection and overhaul-----	-----	-----	-----	See note. 300 hours. 100 hours.
(2) ² Remove and perform bench test-----	-----	-----	-----	
(3) Check and rematch generator outputs-----	-----	-----	-----	
(4) Check pointer and dial for luminosity-----	-----	-----	X	
(5) Check instrument and dependent units for security of mounting.-----	-----	-----	X	
(6) Check leads and connections for secur- ity, anchorage, and condition of insulation.-----	-----	-----	X	
(7) Check mechanical zero and adjust if necessary.-----	X	-----	-----	
(8) Check cover glass for looseness and cracks.-----	X	-----	-----	
(9) Check light on types having individual lights.-----	X	-----	-----	
(10) Close switch and check synchronism indicator for operation.-----	PF	-----	-----	
(11) Inspect for excessive pointer oscilla- tion during engine warm-up period.-----	PF	-----	-----	

¹ Indicator assemblies, engine synchronism, are removed for detailed inspection and repair upon receipt of airplane for "Complete Depot Reconditioning." (TO 00-25-4.)² Bench test is accomplished by base instrument-repair personnel only.**81. Synchroscope (column 21).—a. References.**—TM 1-413; TO 05-60A-2 and 05-60A-4.**b. Inspection requirements.**

	Period			
	D	25	50	Others
(1) ¹ General inspection and overhaul-----	-----	-----	-----	See note.
(2) Inspect indicators for—	-----	-----	-----	
(a) Discolored or chipped luminous mark- ings.-----	-----	-----	X	
(b) Security of mounting-----	-----	-----	X	
(c) Tightness of connections, including electrical leads.-----	-----	-----	X	
(3) Inspect indicator switches and leads for security of mounting and tightness of con- nections.-----	-----	-----	X	
(4) Check cover glass for looseness and cracks.-----	X	-----	-----	
(5) Check zero setting adjustment, and adjust if necessary.-----	X	-----	-----	

¹ Synchroscope is removed for detailed inspection and repairs at depot upon receiving the airplane for "Complete Depot Reconditioning." (TO 00-25-4.)

82. Indicator assembly, fuel-mixture (column 21).—a. References.—TM 1-413; TO 05-3B-2, 05-1-1, 05-1-17, and 05-3B-5, 05-3A-2, 05-3AB-1, 05-3AA-1, and 05-3C-1.

b. Inspection requirements.

	Period			
	D	25	50	Others
(1) Check pointer and dials for luminosity.			X	
(2) ¹ Check filter chamber and nozzles and remove corrosion and foreign matter; remove filter and wash out with gasoline.			X	
(3) ² Check capillary hole in wick assembly for cleanliness and porcelain holder for cracks.			X	
(4) Check sampling tubes and lines for cleanliness, cracks, and restrictions.			X	
(5) Check instrument and dependent units for security of mounting.			X	
(6) Check all leads and connections for leaks, security of mounting, flexibility, and anchorage.			X	
(7) Check mechanical zero.		X		
(8) Check electrical zero.		X		
(9) Check light on types having individual lights.	X			
(10) Check cover glass for—				
(a) Looseness and cracks.	X			
(b) Discernible operations markings.			X	

¹ Also 25 hours after engine change.

² Keep the wick saturated with water at all times.

83. Gage assembly, fuel-level, hydraulic, liquidometer type (column 23).—a. References.—TM 1-413; TO 05-65B-1, 05-1-1, 05-1-17.

b. Inspection requirements.

	Period			
	D	25	50	Others
(1) ¹ General inspection and overhaul.				See note.
(2) Check dial and pointer for luminosity.			X	
(3) Check all leads and connections for leaks, security, flexibility, and anchorage.			X	
(4) Check instruments and dependent units for security in mounting.			X	
(5) Inspect tack unit for defective float and freedom of operation.			X	
(6) Check cover glass for looseness and cracks.	X			
(7) Check light on types having individual lights.	X			
(8) Compare pointer indication with known contents of tank.	PF			

¹ Gage assemblies, fuel level, hydraulic, liquidometer type, are removed for detailed inspection and repair upon receipt of airplane for "Complete Depot Reconditioning." (TO 00-25-4.)

84. Gage assembly, fuel-level, electric, liquidometer type (column 23).—a. References.—TM 1-413; TO 05-55A-3, 05-65A-1, 05-1-1, 05-1-17, 05-65A-3, and 05-55B-6.

b. Inspection requirements.

	Period			
	D	25	50	Others
(1) ¹ General inspection and overhaul	-----	-----	-----	See note.
(2) ² Check transmitter float arm for freedom of operation.	-----	-----	-----	100 hours.
(3) ² Check pointer for sticky operation	-----	-----	-----	100 hours.
(4) Inspect accessible fuel-tank units for corrosion and security of connections.	-----	-----	-----	100 hours.
(5) Check pointer and dials for luminosity	-----	-----	X	
(6) Check all leads and connections for leaks, security, flexibility, and anchorage.	-----	-----	X	
(7) Inspect tank units for correct operation and connection of sliding contacts.	-----	-----	X	
(8) Check around all tank units for leaks	-----	-----	X	
(9) Check instruments and dependent units for security of mounting.	-----	-----	X	
(10) Check cover glass for looseness and cracks.	X	-----	-----	
(11) Check light on types having individual lights.	X	-----	-----	
(12) ³ Compare indication on all tanks with known contents of tanks.	PF	-----	-----	
(13) Check operation of low-level warning signal when this unit is being employed.	PF	-----	-----	

¹ Gage assembly, fuel-level, electrical liquidometer type, is removed for detailed inspection and repair at depot upon receiving the airplane for "Complete Depot Reconditioning." (TO 00-25-4.)

² Only applicable to Selsyn type liquidometer.

³ Refer to calibration chart where applicable.

85. Instrument, Selsyn (position-indicator) (column 44).—a. References.—TM 1-413; TO 05-55A-2, 05-1-1, 05-1-17, 05-55B-5, 05-55C-1, 05-55A-6 and 05-55A-7.

b. Inspection requirements.

	Period			
	D	25	50	Others
(1) Lubricate flange bearings of transmitter.	-----	-----	-----	Yearly.
(2) Check transmitter contacts for cleanliness and proper tension.	-----	-----	X	
(3) ¹ General inspection and overhaul	-----	-----	-----	See note.
(4) Check transmitter-actuating linkage for proper attachment.	-----	-----	X	
(5) Check all leads and connections for security of mounting and anchorage.	-----	-----	X	

¹ Position indicator is removed for detailed inspection and repair at depot, upon receiving the airplane for "Complete Depot Reconditioning." (TO 00-25-4.)

	Period			
	D	25	50	Others
(6) Check indicator for luminosity of markings.	-----	-----	X	
(7) Check indicator and transmitter for security of mounting.	-----	-----	X	
(8) Check smoothness of operation and pointer indications corresponding with position of landing gear, tail wheel, and flaps.	-----	-----	X	
(9) Check pointers for lag when switch is "On" and "Off."	-----	-----	X	
(10) Check cover glass of indicator for looseness and cracks.	X	-----	-----	
(11) Check light on types having individual lights.	X	-----	-----	

86. Instrument, Autosyn, fuel-pressure, oil-pressure, manifold-pressure oil temperature and tachometer (column 21).—a. References.—TM 1-413; TO 05-1-17, 05-1-16, 05-55B-1 and 05-55B-6.

b. Inspection requirements.

	Period			
	D	25	50	Others
(1) ¹ General inspection and overhaul.	-----	-----	-----	See note.
(2) Inspect instrument for security of mounting.	-----	-----	X	
(3) Check all electrical and mechanical connections for condition and tightness of connections.	-----	-----	X	
(4) Inspect pointers and dials for luminosity.	-----	-----	X	
(5) Check cover glass for condition of operations markings.	-----	-----	X	
(6) Inspect instrument for loose or broken cover glass.	X	-----	-----	
(7) Check light on types having individual lights.	X	-----	-----	
(8) ² Turn on Autosyn power supply before starting the engines, and check each Autosyn instrument for zero position or reading consistent with atmospheric conditions.	PF	-----	-----	
(9) Check Autosyn indicators for readings consistent with engine requirements.	PF	-----	-----	
(10) Check for erratic pointer operation during engine warm-up.	PF	-----	-----	

¹ Autosyn indicator assemblies are removed for detailed inspection and repairs at depot upon receiving the airplane for "Complete Depot Reconditioning." (TO 00-25-4.)

² Instrument tolerances are as follows:

Fuel pressure, ± 0.3 pound per square inch.
Oil pressure, ± 5 pounds per square inch.
Manifold pressure, ± 0.4 " mercury (Hg) at atmospheric pressure.
Oil temperature, $\pm 3^{\circ}$ O.
Tachometers, ± 30 rpm.

87. Compass assembly (direct-reading magnetic) (column 44).—a. References.—TM 1-413; TO 05-15-2, 05-15-3, 05-15-9, and 05-1-1.

b. Inspection requirements.

	Period			
	D	25	50	Others
(1) ¹ General inspection and overhaul	-----	-----	-----	See note. 150 hours
(2) ² Compensate and correct compass	-----	-----	-----	
(3) Check instrument for security of mounting.	-----	-----	X	
(4) Check for unbalanced card	-----	-----	X	
(5) Inspect for any defect which impairs visibility of the card.	-----	-----	X	
(6) Inspect verge ring for free operation	-----	-----	X	
(7) Check for discolored or chipped luminous markings.	-----	-----	X	
(8) Check for evidence of bubbles due to insufficient liquid.	-----	-----	X	
(9) Check for damaged external parts	-----	-----	X	
(10) Check instrument compass card for proper compensation data.	-----	-----	X	
(11) Inspect visually for discoloration of liquid.	X	-----	-----	
(12) Check glass and case for signs of leakage.	X	-----	-----	
(13) Check light on types having individual lights.	X	-----	-----	
(14) Check excessive card oscillation or lack of freedom of rotation.	PF	-----	-----	

¹ Compass will be removed for detailed inspection and repair at depot, upon receiving the airplane for "Complete Depot Reconditioning." (TO 00-25-4.)

² Every 90 days, if airplane is flown less than 150 hours. Swing compass any time a major change of equipment is made on an airplane such as engine change, etc., or if the compass is suspected of being in error. The maximum allowable tolerance on any heading after installation and compensation is:

Pilot's compass, $\pm 2^\circ$.

Navigator's compass, $\pm 2^\circ$.

88. Compass assembly (remote-reading magnetic) (column 44).—a. References.—TM 1-413; TO 05-15-5, 05-15-3, and 05-1-17.

b. Inspection requirements.

	Period			
	D	25	50	Others
(1) ¹ General inspection and overhaul	-----	-----	-----	See note. 100 hours.
(2) ² With engines running and rated power turned on, check indicator reading on each cardinal heading.	-----	-----	-----	
(3) Inspect indicators and transmitters for—	-----	-----	-----	
(a) Security of mounting	-----	-----	X	

¹ Remove compass for detailed inspection and repair at depot, upon receiving the airplane for "Complete Depot Reconditioning." (TO 00-25-4.)

² The indicators must read the indications noted on the correction card. If not, refer to TO 05-15-5.

	Period			
	D	25	50	Others
(b) Evidence of leakage-----			X	
(c) ¹ Continuity of wiring-----			X	
(4) Inspect indicator for discolored or chipped luminous markings.			X	
(5) Inspect indicator and transmitter for evidence of leakage.			X	
(6) With compass power on, turn airplane through 360°. Note that indicator follows the transmitter on all headings.	PF			

¹ Before inspecting for continuity, disconnect the units and check the wiring and the units, using an ohmmeter.

89. Compass assembly (gyro-stabilized flux-gate compass system) (column 44).—a. References:—TM 1-413; TO 05-1-1, 05-1-17, 05-15-7, and 05-15-3.

b. Inspection requirements.

	Period			
	D	25	50	Others
(1) ¹ General inspection and overhaul-----				500 hours.
(2) ² Check master and repeater indicators for readings on each of the cardinal headings.				100 hours.
(3) Check indicators for discolored or chipped luminous markings.			X	
(4) Check indicators to ascertain that they follow the motion of the airplane.			X	
(5) Check transmitter, master indicator, amplifier, converter, where supplied, and repeater indicators for security of mounting.			X	
(6) ³ Check wiring connections of converter for—				
(a) Cleanliness-----			X	
(b) Tightness of connections-----			X	
(7) ⁴ Check converter brushes for—				
(a) Cleanliness-----			X	
(b) Binding-----			X	
(c) Wear-----			X	
(8) ⁵ Remove brush spring assemblies and check spring tension.			X	
(9) ⁶ Check for rough or dirty commutator.			X	
(10) Check for broken or loose cover glass.	X			
(11) ⁷ Check indicators to ascertain that they follow the motion of the airplane.	PF			

¹ Instrument forwarded to a properly equipped repair depot for overhaul.

² With the engines running, the gyro uncaged, and 30 minutes allowed for the erection system to bring it to a vertical, and if possible the aircraft brought into a position simulating normal flight, indicators should be observed and must read within 2° of each of the 4 headings. If indications are not within the specified tolerance, proceed with maintenance work as outlined in TO 05-15-7, section V, paragraph 2, under 100-hour.

³ Before making inspection, remove converter end covers. Resolder loose or broken connections in the base.

⁴ If brushes bind, wipe with a gasoline-moistened cloth. Replace if worn to an over-all length of approximately $\frac{3}{32}$ inch. Brushes should be replaced when the maximum wear limit is reached, to insure proper operation until the next inspection period. When replacing a worn brush, make sure that it is seated properly. Insert a strip of No. 000 sandpaper between the commutator and brush, with the sand side next to the brush. Pull in direction of rotation. Repeat until brush is seated fully. **Caution:** Do not use emery cloth or coarse sandpaper. Remove all sand and metal particles with an air blast.

⁵ Replace if tension is less than $3\frac{3}{4}$ ounces when compressed to $\frac{3}{16}$ inch.

⁶ Wipe dirty commutator with a clean dry cloth. If necessary, polish with No. 000 sandpaper. **Caution:** Keep commutator free from grease and oil at all times.

⁷ With gyro caged, apply rated power to compass system and allow 10 minutes for gyro to come to speed. While aircraft is being taxied into position, observe the indications of the compass system. If indicator fails to follow the motion of the airplane, proceed with maintenance as indicated in TO 05-15-7, section V, paragraph 2.

90. Indicator assembly, air speed (column 44).—a. References.—TM 1-413; TO 05-10-2, 05-50-1, 05-1-1, 05-1-17, and 05-20-8.

b. Inspection requirements.

	Period			
	D	25	50	Others
(1) ¹ General inspection and overhaul.....	-----	-----	-----	See note.
(2) Drain connecting lines by removing drain plugs.....	-----	-----	-----	100 hours.
(3) ² Check lines for leaks.....	-----	-----	-----	100 hours.
(4) Check installation for voltage drop.....	-----	-----	-----	100 hours.
(5) Check—				
(a) Pitot, static, and drain holes for obstructions.....	-----	-----	X	
(b) Loose pitot and static connections.....	-----	-----	X	
(6) Check dials and pointer for proper luminosity.....	-----	-----	X	
(7) Check tube assembly installation for leaks and obstructions.....	-----	-----	X	
(8) Check instruments and dependent units for security of mounting.....	-----	-----	X	
(9) Check cover glass for operations markings.....	-----	-----	X	
(10) Check all leads and connections for security, flexibility, and anchorage.....	-----	-----	X	
(11) Check cover glass for looseness and cracks.....	X	-----	-----	
(12) Check pitot static head for cleanliness and alinement.....	X	-----	-----	
(13) ³ Check pointer for tolerance at zero.....	X	-----	-----	
(14) Check light on types having individual lights.....	X	-----	-----	
(15) Check heater for operation.....	PF	-----	-----	
(16) Remove cover socks.....	PF	-----	-----	
(17) Check pointer for excessive oscillation.....	PF	-----	-----	
(18) Install cover socks.....	AF	-----	-----	

¹ Air speed indicator is removed for detailed inspection and repair at depot, upon receiving the airplane for "Complete Depot Reconditioning." Remove for depot check each period of 12 months, or if new or newly overhauled instruments are not available, instruments operating properly may be used until serviceable instruments are received; additional time not to exceed 6 months. (TO 00-25-4.)

² Use prescribed leak test.

³ Maximum allowable tolerance, ± 2 mph.

91. Indicator assembly, rate-of-climb (column 44).—a. References.—TM 1-413; TO 05-20-11, 05-20-26, 05-1-1, 05-1-17, 05-50-1, 05-20-29, 05-20-27, and 05-20-17.

b. Inspection requirements.

	Period			
	D	25	50	Others
(1) ¹ General inspection and overhaul.....	-----	-----	-----	See note.
(2) Check pointer and dial for proper luminosity.	-----	-----	X	
(3) Check instrument for security of mounting.	-----	-----	X	
(4) Check all connections for security, flexibility, and anchorage.	-----	-----	X	
(5) Check cover glass for looseness and cracks.	X	-----	-----	
(6) Check light on types having individual lights.	X	-----	-----	
(7) Check adjusting screw for freedom of operation.	X	-----	-----	
(8) Set pointer at zero.....	PF	-----	-----	

¹ Indicator assembly, rate-of-climb, is removed for detailed inspection and repair upon receipt of airplane for "Complete Depot Reconditioning." Remove for depot check each period of 12 months, or if new or newly overhauled instruments are not available, instruments operating properly may be used until serviceable instruments are received; additional time not to exceed 6 months. (TO 00-25-4.)

92. Altimeter assembly, sensitive (column 44).—a. References.—TM 1413; TO 05-30-1, 05-1-17, 05-30-4, and 05-50-1.

b. Inspection requirements.

	Period			
	D	25	50	Others
(1) ¹ General inspection and overhaul.....	-----	-----	-----	See note.
(2) Check for synchronism of barometric scale and reference markers.	-----	-----	X	
(3) Check for zero setting error.....	-----	-----	X	
(4) Check pointers and dial for proper luminosity.	-----	-----	X	
(5) Check all lines and connections for leaks, security, and anchorage.	-----	-----	X	
(6) Check instrument and dependent units for security of mounting.	-----	-----	X	
(7) Test the setting knob for freedom of movement and see that all pointers and reference markers move when it is turned.	X	-----	-----	
(8) Check cover glass for looseness and cracks; check pointers and dials for looseness.	X	-----	-----	
(9) Check light on types having individual lights.	X	-----	-----	
(10) Check pointer for excessive oscillation.	PF	-----	-----	
(11) ² Set barometric pressure scale to 29.92 mercury (Hg).	PF	-----	-----	

¹ Remove for depot check each period of 12 months, or if new or newly overhauled instruments are not available, instruments operating properly may be used until serviceable instruments are received; additional time not to exceed 6 months. (TO 00-25-4.)

² Pointers must read within ± 30 feet of the indication corresponding to the reading of a standard mercurial barometer.

93. Indicator assembly, bank-and-turn (column 44).—a. References.—TM 1-413; TO 05-20-2, 05-1-1, 05-1-17, 05-1-32, and 05-20A-1.

b. Inspection requirements.

	Period			
	D	25	50	Others
(1) ¹ General inspection and overhaul	-----	-----	-----	See note.
(2) Remove drain plug on types having drain plug to drain condensate and excess oil.	-----	-----	-----	100 hours.
(3) ² Clean jet cover, screen, and common air filter.	-----	-----	-----	100 hours.
(4) Lubricate as specified in basic Technical Order.	-----	-----	-----	100 hours.
(5) ³ Check suction	-----	-----	-----	100 hours.
(6) ⁴ Check pointer for proper zero position	-----	-----	X	
(7) Inspect for discolored or chipped markings.	-----	-----	X	
(8) Check all lines and connections for leaks, security, flexibility, and anchorage.	-----	-----	X	
(9) Check alinement on panel	-----	-----	X	
(10) Check instruments and units for security of mounting.	-----	-----	X	
(11) Check inclinometer for discolored liquid and free action of ball.	X	-----	-----	
(12) Check cover glass for looseness and cracks.	X	-----	-----	
(13) Check light on types having individual lights.	X	-----	-----	

¹ Remove for depot check each period of 12 months, or if new or newly overhauled instruments are not available, instruments operating properly may be used until serviceable equipment is received, additional time not to exceed 6 months.

² Frequency of cleaning screens and filters depends largely upon service conditions. A dirty screen will be indicated by a higher vacuum than normal.

³ Suction to be not less than 1.8 or more than 2.05 inches mercury (Hg).

⁴ With airplane on level ground.

94. Indicator assembly, magnitude-of-turn (column 44).—a. References.—TM 1-413; TO 05-20-4, 05-1-1, 05-1-17, 05-1-32, and 05-20-10.

b. Inspection requirements.

	Period			
	D	25	50	Others
(1) ¹ General inspection and overhaul	-----	-----	-----	See note.
(2) ² Check screen and common air filter for cleanliness.	-----	-----	X	
(3) Check instrument for security of mounting.	-----	-----	X	
(4) Check all leads and connections for leaks, security, flexibility, and anchorage.	-----	-----	X	

¹ Remove for depot check each period of 12 months. If new or newly overhauled instruments are not available, instruments operating properly may be used until serviceable instruments are received; time not to exceed 6 months. (TO 00-25-4.)

² Cleaning of screens will be governed by service conditions only.

	Period			
	D	25	50	Others
(5) Check markings for luminosity-----			X	
(6) Check ball bank indicator for liquid and for alinement.			X	
(7) Check cover glass for looseness and cracks.	X			
(8) Check light on types having individual lights.	X			
(9) Test caging knob for operation-----	PF			
(10) ² Check suction-----	PF			
(11) Check instrument mount for excessive vibration.	PF			

³ Suction to be not less than 3.5 or more than 5 inches mercury (Hg). The ideal suction is 4 inches mercury (Hg).

95. Indicator assembly, flight (column 44).—a. References.—
 TM 1-413; TO 05-20-3, 05-1-17, 05-1-1, 05-1-32, and 05-20-9.

b. Inspection requirements.

	Period			
	D	25	50	Others
(1) ¹ General inspection and overhaul-----				See note.
(2) ² Check screens and common air filter for cleanliness.			X	
(3) Check alinement of instrument case on mounting board.			X	
(4) Check markings for luminosity-----			X	
(5) Check instrument and dependent units for security of mounting.			X	
(6) Check all leads and connections for leaks, security, flexibility, and anchorage.			X	
(7) Check cover glass for looseness and cracks.	X			
(8) Check light on types having individual lights.	X			
(9) Make alinement test-----	PF			
(10) Make starting test-----	PF			
(11) ³ Check suction-----	PF			
(12) Test operation of caging device-----	PF			
(13) Check instrument mount for excessive vibration.	PF			

¹ Remove for depot check each period of 12 months, or if new or newly overhauled instruments are not available, instruments operating properly may be used until serviceable equipment is received; additional time not to exceed 6 months. (TO 00-25-4.)

² Frequency of cleaning screens and filters depends largely upon service conditions. A dirty screen will be indicated by a higher vacuum than normal.

³ Suction to be not less than 3.5 or more than 5 inches mercury (Hg). The ideal suction is 4 inches mercury (Hg).

96. Automatic pilot (types A-2, A-3, and A-4) (column 44).—a. References.—TM 1-413; TO 05-45AB-1, 05-45AB-2, 05-45-1, 05-45-2, 05-1-1, 05-1-17, 05-45AC-2, 05-45AC-1, and 05-1-32.

b. Inspection requirements.

	Period			
	D	25	50	Others
(1) ¹ General inspection and overhaul.....	-----	-----	-----	See note.
(2) Drain sump and clean Cuno strainer.....	-----	-----	-----	EC.
(3) Remove gyro-control units, bench test, and replace rubber grommets.	-----	-----	-----	300 hours.
(4) Drain oil from reservoir and refill.....	-----	-----	-----	100 hours.
(5) ² Inspect air-intake screens and filters for cleanliness.	-----	-----	X	
(6) Check instrument and dependent units for security of mounting and condition of shock units.	-----	-----	X	
(7) Check flexible hose for deterioration and breaks.	-----	-----	X	
(8) Check follow-up cables for wear, tension and safetying.	-----	-----	X	
(9) Check for discolored or chipped instrument markings.	-----	-----	X	
(10) Check air relay and balanced oil-valve assembly for freedom of stem movement.	-----	-----	X	
(11) Check system for signs of leakage.....	-----	-----	X	
(12) Check inclinometer for discolored liquid and free action of ball.	-----	-----	X	
(13) Check to see that automatic pilot can be overpowered.	-----	X	-----	
(14) Check cover glasses for looseness or cracks.	-----	X	-----	
(15) Check lights.....	-----	X	-----	
(16) Check filter element in oil and air filters for cleanliness.	-----	X	-----	
(17) Check oil level in sump.....	X	-----	-----	
(18) Check caging mechanisms for freedom of operation.	X	-----	-----	
(19) ³ Check controls for operation.....	PF	-----	-----	
(20) Check oil pressure.....	PF	-----	-----	
(21) ⁴ Check suction.....	PF	-----	-----	
(22) Check for air in system.....	PF	-----	-----	
(23) Ground test automatic pilot.....	PF	-----	-----	

¹ Remove directional gyro and bank-and-climb unit for depot check each period of 12 months. If new or newly overhauled instruments are not available, instruments operating properly may be used until serviceable instruments are received; time not to exceed 6 months. (TO 00-25-4.)

² Cleaning of screens will be governed by service conditions only.

³ The operating oil pressure varies with the type of airplane.

⁴ Suction to be not less than 3.00 or more than 5.00 inches mercury (Hg).

NOTE.—Inspect individual instruments in accordance with instruction outlined under pertinent paragraph of this manual.

97. Automatic pilot (type A-5) (column 44).—a. References.—
 TM 1-413; TO 05-45AD-2, 05-1-17, 05-45AD-1, and 05-1-31.

b. Inspection requirements.

	Period			
	D	25	50	Others
(1) ¹ Remove the following units for overhaul: vertical gyro, directional gyro, control unit, amplifiers, altitude, altitude controls, trim tab, servos.				600 hours.
(2) ¹ Check amplifiers in amplifier checking fixture.				300 hours.
(3) ¹ Remove and bench check directional and vertical gyros.				300 hours.
(4) Drain all servos and replace oil.				100 hours.
(5) ¹ Check all vacuum tubes.			X	
(6) ¹ Check and clean all moving electrical contacts, slip rings, and brushes.			X	
(7) Check all cables for—				
(a) Fraying.			X	
(b) Tension.			X	
(c) Anchorage.			X	
(d) Alinement on pulleys.			X	
(e) Freedom of operation.			X	
(f) Safetying.			X	
(8) ¹ Lubricate bearings and moving parts of gyro unit.			X	
(9) Check gyro units and accessories for security of mounting.			X	
(10) Check operation of emergency release of servos.	X			
(11) Check servo unit attaching bolts.	X			
(12) Check and clean filter elements in servos.	X			
(13) Check oil level in servos.	X			
(14) Check operation of automatic pilot.	PF			

¹ Work to be performed by instrument specialist only.

NOTE.—In addition to the above inspections, perform all routine instrument inspections common to all instruments.

98. Clock assembly, aircraft (column 44).—a. References.—
 TM 1-413; TO 05-1-9, 05-1-1, and 05-1-17.

b. Inspection requirements.

	Period			
	D	25	50	Others
(1) ¹ General inspection and overhaul.				See note.
(2) Check for discolored or chipped luminous markings.			X	
(3) Check for security of mounting.			X	
(4) Check cover glass for looseness and cracks.	X			
(5) Check light on types having individual lights.	X			
(6) ² Wind and set clock.	PF			

¹ Clocks are removed for detailed inspection and repairs at the depot, upon receiving the airplane for "Complete Depot Reconditioning" in accordance with TO 00-25-4.

² Care should be taken not to wind the mainspring too tight.

99. Driftmeter (column 44).—*a. References.*—TM 1-413; TO 05-25A-2, 05-25B-2, 05-25CA-2, 05-1-1, 05-1-17, 05-25DA-2, 05-25BB-2, 05-25AA-2, 05-25BA-2, 05-25-1, 05-25-2, and 05-25-3.
b. Inspection requirements.

	Period			
	D	25	50	Others
(1) ¹ General inspection and overhaul.....	-----	-----	-----	See note.
(2) Check alinement.....	-----	-----	X	
(3) Check for security of mounting.....	-----	-----	X	
(4) Check for damaged or broken external parts.	-----	-----	X	
(5) Check for smooth operation of mechanical parts.	-----	-----	X	
(6) Check light on types having individual lights.	X	-----	-----	
(7) ² Inspect external lens surfaces for cleanliness.	PF	-----	-----	

¹ Driftmeter is removed for detailed inspection and repair upon receipt of airplane for "Complete Depot Reconditioning." (TO 00-25-4.)

² Use lens paper when cleaning, which should be done as infrequently as possible.

100. Accelerometer (column 44).—*a. References.*—TM 1-413; TO 05-20-23, 05-20-24, 05-1-1, and 05-1-17.
b. Inspection requirements.

	Period			
	D	25	50	Others
(1) ¹ Depot inspection and repair.....	-----	-----	-----	See note.
(2) Check for discolored or chipped luminous markings.	-----	-----	X	
(3) Check for proper location and level position of airplane.	-----	-----	X	
(4) Check for loose pointers.....	-----	-----	X	
(5) Check for security of mounting.....	-----	-----	X	
(6) Check cover glass for looseness or cracks.	X	-----	-----	
(7) Test setting knob for operation.....	X	-----	-----	
(8) Set pointers at plus one "g".....	PF	-----	-----	
(9) Check light on types having individual lights.	X	-----	-----	

¹ Depot inspection and repair at least once each 12 months. (TO 00-25-4.)

SECTION IX

INSPECTION OF HYDRAULIC SYSTEMS AND
MISCELLANEOUS EQUIPMENT

	Paragraph
Cylinders, gas CO ₂	101
Extinguisher, fire, fixed type.....	102
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Raft, pneumatic.....	104
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De-icer system (inflatable rubber-shoe type).....	107
Heating and ventilating system (steam type).....	108
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Hydraulic system.....	110
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Vacuum systems.....	112
Air-compressor unit (Romec E-14).....	113

101. Cylinders, gas CO₂ (column 43).—a. References.—TO 16-20-1 and 16-20-2.

b. Inspection requirements.

	Period			
	D	25	50	Others
(1) ¹ Check date of last quinquennial test.....			X	6 months.
(2) ² Check charge of CO ₂ gas.....				
(3) Check date of last weight inspection.....	X			
(4) ³ Check for proper mounting and security of attachment, general condition.....	X			
(5) ⁴ Check for evidence of discharge.....	PF			

Code color: Aluminum.

¹ The date of the last quinquennial test is also checked at the time of installation and at each 6-month weight test inspection. If the test is due within 6 months, cylinders are removed and replaced.

² Also inspect by weighing before installation and at the first 50-hour inspection period.

³ Straight rigid syphon, mount vertically. Short flexible syphon, mount horizontally.

⁴ Indicator disk ruptured or safetying of discharge mechanism broken.

The cylinder charges for the various installations are:

	Maximum charge (pounds)	Permissible variation less than maximum charge.	
		Pounds	Ounces
Fire extinguisher, hand, type A-14.....	3. 62	0. 20	3. 20
Fire extinguisher, hand, type 142.....			
Fire extinguisher, hand, type A-15.....	2. 00	. 12	1. 92
Fire extinguisher, fixed, type A-11.....	5. 00	. 25	4. 00
Fire extinguisher, fixed, type A-12.....	7. 25	. 43	7. 00
Fire extinguisher, fixed, type A-13.....	7. 25	. 43	7. 00
Pneumatic raft, type A-1.....	3. 25	. 03	. 50
Pneumatic raft, type A-2.....	3. 25	. 03	. 50
Pneumatic raft, type B-1.....	1. 25	. 01	. 20
Pneumatic raft, type B-2.....	1. 25	. 01	. 20
Pneumatic raft, type B-3.....	1. 25	. 01	. 20
Pneumatic raft, type C-1.....	. 90	. 01	. 20
Pneumatic vest, type B-3.....			

102. Extinguisher, fire, fixed type (column 43).—a. References.—TO 03-45C-1, 03-45C-6, and 03-45C-7.

b. Inspection requirements.

	Period			
	D	25	50	Others
(1) Check tubing for loose connections, loose attachment, distortion, cracks, dents, or corrosion.	-----	-----	X	After discharge.
(2) ¹ Check perforations in distributor tubing for obstructions.	-----	-----	X	
(3) ² Lubricate discharge cable.	-----	-----	X	
(4) ³ Check setting of distributor cock. Reset after discharge.	-----	-----	-----	
(5) Check CO ₂ cylinder. (See par. 101)-----	PF	-----	-----	

Code color: Brown.

¹ In case perforations in distributor tubing become clogged, open up holes and direct a stream of compressed air through the tube from end to end.

² Smear with grease, graphite, medium, Specification No. 2-50.

³ A-12 installation.—Cock is kept in closed position.

A-13 installation.—Cock is kept in center engine position.

103. Extinguisher, fire, hand-pump type (column 43).—a. References.—TO 03-45-1 and 03-45B-1.

b. Inspection requirements.

	Period			
	D	25	50	Others
(1) ¹ Check for proper operation.	-----	-----	-----	12 months.
(2) ² See that extinguisher is filled and does not leak.	X	-----	-----	
(3) ³ See that seal is intact, dated inspection tag attached, and safetying not broken.	X	-----	-----	
(4) Check discharge nozzle for obstruction.	X	-----	-----	
(5) See that bracket is firmly attached, securely holds, and readily releases extinguisher.	X	-----	-----	

¹ Polish pump shaft and lubricate with grease, Specification No. VV-G-681. Soften leather cup with few drops of neat's-foot oil. Also conduct operation check whenever extinguisher is refilled. Refill with liquid, fire extinguisher, Specification No. O-F-380.

² Weigh extinguisher, if in doubt, and replace leaking extinguisher.

³ Use 3/16-inch lead seals, 0.020-inch diameter soft copper wire for safetying, and 0.015-inch thick by 1/4-inch wide aluminum sheet for inspection tag.

104. Raft, pneumatic (column 43).—a. References.—TO 04-15-1, 04-15-1A, 04-15-2, and 04-15-2A.

b. Inspection requirements.

	Period			
	D	25	50	Others
(1) ¹ Check for leaks.....	-----	-----	-----	6 months.
(2) ² Check accessories for completeness.....	-----	-----	X	
(3) ³ Check for chafed areas.....	-----	-----	X	
(4) Check closing of topping-off valves.....	-----	-----	X	
(5) ⁴ Check CO ₂ cylinder for evidence of discharge.	-----	-----	X	
(6) ⁵ Check for date of manufacture.....	-----	-----	X	
(7) ⁶ Examine pack for oil and acid contamination.	D	-----	-----	
(8) Check CO ₂ union nut for tightness.....	D	-----	-----	
(9) Check lock pin in valve handwheel for easy removal.	D	-----	-----	
(10) Ascertain that the ¼-inch rope from the pack cover grommet is securely tied to raft.	D	-----	-----	
(11) Check for last semimonthly inspection.	D	-----	-----	

¹ Also at installation. Inflate A-3 and B-4 rafts by operating inflation system or with compressed air not exceeding 2½ pounds per square inch pressure. Check with soapy water. Inflate A-2, B-3, and C-1 rafts by operating CO₂ inflation system or with compressed air not exceeding 2 pounds per square inch pressure. Allow raft to stand for 6 hours. Check for a deflation of not to exceed 10 percent.

² The required accessories are two oars, one hand pump, one repair kit, one charged CO₂ cylinder, 40 feet of 75-pound lashing cord, one carrying case, one emergency signal kit bag, one M2 pyrotechnic pistol, six M11 parachute signal flares, one bailing bucket, and four bullet hole plugs. Additional equipment: water emergency drinking (canned), sea markers-fluorescein dye, Army field ration "D", flashlight type A-7 floating identification.

³ Rafts with any indication of chafing will be thoroughly tested for leaks prior to installation.

⁴ If doubt exists as to the weight of gas in any cylinder the amount of charge will be determined by weighing as described in TO 16-20-2.

⁵ Service life from date of manufacture: A-3, 3½ years; A-2, B-3, and C-1, 4 years.

⁶ Inspections (7) through (11) apply only to one-man parachute type raft.

105. Vest, pneumatic (column 43).—a. Reference.—TO 13-1-3.

b. Inspection requirements.

	Period			
	D	25	50	Others
(1) ¹ Check for leaks.....	-----	-----	-----	6 months.
(2) Check covering for chafed or snagged places.	-----	-----	-----	6 months.
(3) Check release mechanism for freedom of operation.	-----	-----	-----	6 months.
(4) ² Check cylinders for discharge.....	PF	-----	-----	
(5) ³ Check for leaks.....	PF	-----	-----	
(6) ⁴ Check closing of mouth valves.....	PF	-----	-----	

¹ Inflate by operating CO₂ inflation system and submerge in water for leak test. This operation is also performed at time of issue.

² Note that sealing disk is intact.

³ Prior to first flight of day, inflate by mouth and visually check.

⁴ Turn clockwise to close.

106. Oxygen system, gaseous type (column 41).—a. References.—TO 03-50-1, 03-50A-1, 16-20-1, 13-20-1, 03-50-1A, 03-50-8, 03-50-9, and 03-50-16; also Technical Order of airplane involved.

b. Inspection requirements.

	Period			
	D	25	50	Others
(1) ¹ Check date of last quinquennial cylinder test.			X	
(2) Check state of charge	PF			
(3) ² Check of leaks	PF			
(4) ³ Check operation of regulator	PF			
(5) Check for completeness of equipment	X			
(6) ⁴ Check mask for general condition and clean.	X, AF			
(7) ⁵ Check closing of cylinder valve	AF			

Code color: Light green.

¹ The date of last quinquennial test is checked at the time of installation and at each 50-hour inspection thereafter. If the test is due within 3 months, the cylinder is removed and replaced.

² Observe pressure drop, regulator valve closed.

³ Flow meter of type A-8, manually controlled regulator, should register 35 with control knob full open, cylinder pressure above 500 pounds per square inch.

⁴ At completion of flights involving use of oxygen, sterilize mouthpieces, clean masks with a good quality facial soap and warm water. Exercise special care in handling mask. In A-8 type masks, also clean inside of breather bag.

⁵ Close all valves on oxygen cylinders immediately and check contents of cylinders by indicated pressure.

107. De-icer system (inflatable rubber-shoe type) (column 43).—a. References.—TO 03-35B-1, 03-35B2, 03-35B3, 03-35B4, and 03-35B-6; also Technical Order for airplane involved.

b. Inspection requirements.

	Period			
	D	25	50	Others
(1) ¹ Remove relief valve for overhaul				300 hours.
(2) ² Clean air-filter cartridge				300 hours.
(3) Test check-valve assembly for leaks (multiengine installation).				100 hours.
(4) ³ Remove distributor valve and motor for overhaul.				See note.
(5) ⁴ Check resistance of de-icer shoe			X	
(6) Check operating shaft of distributor for free turning.			X	
(7) Drain fluid sumps			X	
(8) ⁵ Check brushes of distributor valve motor.			X	
(9) Check feed lines for security of attachment, leaks, and restrictions.		X		

Code color: Light blue, light green.

¹ Depot overhaul only.

² Remove and rinse in gasoline.

³ At the end of cold weather operations and at least once each year.

⁴ At installation and also after patching. Resistance not to exceed 15,000 ohms.

⁵ Replace brushes when worn to $1\frac{1}{2}$ inch long.

	Period			
	D	25	50	Others
(10) Check de-icer shoe attachment screws for tightness.	-----	X	-----	
(11) Check deterioration of shoes.	X	-----	-----	
(12) Check shoes for punctures, bruises, and loose patches.	PF	-----	-----	
(13) ⁶ Check operation of system.	PF	-----	-----	
(14) Discharge de-icer boots by brushing lightly with a grounded wire brush.	AF	-----	-----	

⁶ Note minimum pressure shown on pressure gage. Operating pressure, 7 pounds per square inch; operating time, 40 seconds per cycle.

Sequence of inflation: See Technical Order for airplane involved.

108. Heating and ventilating system (steam type) (column 31).—a. Reference.—Basic Technical Order of airplane involved.

b. Inspection requirements.

	Period			
	D	25	50	Others
(1) Check reservoir for corrosion.	-----	-----	-----	6 months.
(2) Check radiator for foreign matter.	-----	-----	-----	200 hours.
(3) ¹ Check heating system lines for obstruction (by air blowing).	-----	-----	-----	100 hours.
(4) Check boiler and radiator for cracks, loose fittings, and security of attachment.	-----	X	-----	
(5) Check operation of heater controls.	-----	X	-----	
(6) Check for leaks.	X	-----	-----	
(7) Add distilled water in reservoir.	-----	-----	-----	As required.

¹ Color code: Light blue, black.

109. Heaters (Stewart-Warner gasoline type 789-M) (column 31).—a. Reference.—TO 03-70A-1.

b. Inspection requirements.

	Period			
	D	25	50	Others
(1) Disassemble and clean heater, back casting, and oven.	-----	-----	-----	100 hours.
(2) Check all fuel lines and electrical connection for tightness.	-----	-----	-----	100 hours.
(3) Inspect fan blade for clearance.	-----	-----	-----	100 hours.
(4) ¹ Check fan motor for proper operation.	-----	-----	-----	100 hours.
(5) ² Check current to igniter.	-----	-----	X	
(6) Inspect for security of mounting.	-----	X	-----	
(7) Clean and tighten all loose connections.	-----	X	-----	

¹ Switch "on", motor should run constantly. Slow or inoperative motor will cause unit to overheat and burn out.

² Switch "on", connect voltmeter to igniter terminal. Voltage should not be less than 22 volts. Outer casing of igniter should warm up. If not, it is burned out and must be replaced. If no current is present thermal snap switch is probably not closing. If defective, it must be replaced.

110. Hydraulic system (column 39).—a. References.—TM 1-411; TO 06-1-2, and basic Technical Order on aircraft or unit involved.

b. Inspection requirements.

	Period			
	D	25	50	Others
(1) Inspect and test all relief valves for proper release pressure.	-----	-----	-----	500 hours.
(2) Clean strainer screen in bottom of oil-supply reservoir.	-----	-----	-----	400 hours.
(3) Remove engine-driven pump for overhaul.	-----	-----	-----	EC.
(4) Check air pressure in accumulator.	-----	-----	X	
(5) Clean Cuno strainer.	-----	-----	X	
(6) Inspect all lines and connections for leaks, kinks, dents, cracks, security of anchorage, and wear due to chafing or vibration.	-----	X	-----	
(7) Inspect all valves for general condition, and lubricate system as required.	-----	X	-----	
(8) Check hand-operated hydraulic pumps for condition and functioning.	-----	X	-----	
(9) Clean strainer screen in filler neck of hydraulic-fluid reservoir.	-----	X	-----	
(10) ¹ Check for fluid level.	X, AF	-----	-----	
(11) Check for evidences of leakage.	X	-----	-----	
(12) ² Check pressure of hydraulic system.	PF	-----	-----	

Code marking: Light blue, yellow, light blue.

¹ Use hydraulic fluid as specified for the particular airplane.

² Adjust and set relief valves according to instruction in Technical Order pertaining to specific installation. Check air pressure in hydraulic accumulator.

Inspection periods may be different for a given system. Consult the basic Technical Order for the airplane involved.

111. Hydraulic pumps (engine-driven and motor-driven) (columns 22-39).—a. References.—TM 1-411; TO 03-30CA-1, 03-30CA-2, 03-30CB-1, 03-30CC-1, 03-30CC-3, 03-30CA-3, 03-30CF-1, 03-30CH-1, and 03-30CG-1.

b. Inspection requirements.

	Period			
	D	25	50	Others
(1) Inspect motor for—				
(a) Loose connections.	-----	-----	X	
(b) ¹ Worn or binding brushes.	-----	-----	X	
(c) ² Proper tension of brush springs.	-----	-----	X	
(d) ³ Dirty or rough commutator.	-----	-----	X	
(2) Check for—				
(a) Tightness of pipe connections.	-----	-----	X	
(b) Tightness and safetying of all nuts.	-----	-----	X	
(c) ⁴ Freedom of motion of rotating parts.	-----	-----	X	
(3) ⁵ Check pump for security of mounting tightness of nuts, and line connections.	-----	-----	X	

Inspection periods will vary for different pumps. Consult Technical Order for specific pump involved.
¹ On Eclipse models, permissible brush wear is $\frac{5}{16}$ inch from a new length of $\frac{1}{2}$ inch. On Pesco models, permissible wear is to $\frac{1}{16}$ inch above the brush-lever notch in the brush holder.

² Brush springs are replaced on motors if the tension, when mounted in the motor, is less than 18 ounces on Eclipse models or 20 ounces on Pesco models.

³ Remove dirt or grease with gasoline moistened rag and smooth with No. 000 sandpaper.

⁴ Check on first 50-hour inspection after installation; if binding, replace pump.

⁵ Pesco engine-driven pumps are removed and checked for freedom of motion of rotating parts at the first 50-hour inspection only after initial installation.

112. Vacuum systems (column 43).—a. References.—TO 03-30AA-1, 03-30AB-1, 03-30-10, and 03-30-9; also basic Technical Order for airplane involved.

b. Inspection requirements.

	Period			
	D	25	50	Others
(1) Inspect motor-driven vacuum pumps for—				
(a) ¹ Worn or binding brushes.....	-----	-----	-----	200 hours.
(b) Dirty or rough commutator.....	-----	-----	-----	200 hours.
(c) Tightness of brush band.....	-----	-----	-----	200 hours.
(2) ² Check pump for security of mounting and safetying.	-----	-----	-----	100 hours.
(3) ³ Examine relief valve screen for cleanliness.	-----	-----	-----	100 hours.
(4) ⁴ Inspect safety valve for cleanliness, worn valve disk, and required spring tension.	-----	-----	-----	100 hours.
(5) ⁵ Remove and clean oil separator screens.	-----	-----	-----	100 hours.
(6) ⁶ Check lines and units for security or mounting, condition of connections.	-----	X	-----	
(7) Check for proper code markings.....	-----	X	-----	
(8) Check for proper operation of the system.	PF	-----	-----	

¹ Replace brush if worn to $\frac{1}{16}$ inch above the brush-lever notch in the brush holder.

² If pump is intended for internal venting, remove plug marked "Pres" located near the mounting flange and clean.

³ If dirty, remove valve, loosen screen assembly with a wrench, and clean screen in a suitable cleaning fluid.

⁴ Remove valve guide and wash it in a suitable solvent cleaning fluid. If valve disk is worn, dress it carefully with a flat oilstone. Test spring tension by measuring the force required to compress it to $1\frac{1}{4}$ inches in length. This should be 3 to 7 pounds or more.

⁵ Oil separators not having outlet fittings and removable screens must be removed as a unit and washed out with cleaning fluid.

⁶ Color code: White, light green.

113. Air-compressor unit (Romec E-14) (column 43).—a. Reference.—TO 03-30B-1.

b. Inspection requirements.

	Period			
	D	25	50	Others
(1) ¹ Change oil.....	-----	-----	-----	100 hours.
(2) ² Check oil level and drain off water accumulations to keep corrosion at a minimum.	-----	X	-----	
(3) ³ Check for air leakage.....	-----	X	-----	
(4) ⁴ Check for security of attachment and tightness of connections, both mechanical and electrical; and for identification marking of lines.	-----	X	-----	
(5) Check for proper operation.....	PF	-----	-----	
(6) ⁵ Check oil level.....	X	-----	-----	

¹ Use oil, lubricating, aircraft-engine, of approved grade.

² At least 3 or 4 hours should elapse after the airplane has landed before this operation is performed.

³ This check is made by building up tank pressure to 200 pounds with the Parker valve shut off. If the gage shows a drop in pressure, there is an air leak. The most likely places are check valve, relief valve, and connecting lines. Oil or soapy water should be used to detect the location of leaks.

⁴ Color code: Light blue, light green.

⁵ Must be above low-level cock but not above high-level cock; release air pressure before checking oil level

SECTION X

INSPECTION OF ENGINES

	Paragraph
Cooling system (liquid)	114
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114. Cooling system (liquid) (column 25).—a. References.—
 TM 1-405; TO 02-5AC-2, 02-55AA-2, 05-1-16, and 24-25-1.

b. Inspection requirements.

	Period			
	D	25	50	Others
(1) ¹ Check thermometer indicator to determine if it is correctly identified.	-----	-----	-----	EC.
(2) ² Drain and flush cooling system, using boiling hot water to flush the system (V-1650 engines only).	-----	-----	-----	200 hours.
(3) ³ Drain and flush cooling systems; check drain plugs for tightness and safetying (V-1710 engines only).	-----	-----	X	
(4) Remove ball check valve from filler unit on expansion tank and inspect ball for freedom of motion.	-----	-----	X	
(5) ⁴ Check coolant specific gravity (V-1650 engines only).	-----	-----	X	
(6) Lubricate cowl flaps or shutter assembly and controls according to the handbook on the airplane.	-----	X	-----	
(7) ⁴ Inspect the small cylinder-liner drain holes at the base of each cylinder (near the parting surface of the crankcase).	-----	X	-----	
(8) ⁵ Inspect lines for proper identification markings, anchorage, and wear.	-----	X	-----	
(9) ⁶ Inspect coolant pump for leaks; adjust or repack gland if necessary; lubricate pump-shaft bearing where fitting is provided.	-----	X	-----	
(10) Inspect radiators, expansion tanks, lines, and connections for leaks. Check hose clamps for proper condition; drain cocks for proper safetying; and shutters, if provided, for operation to extreme positions.	-----	X	-----	
(11) Check liquid-cooling systems for proper fluid level and ascertain that filler caps are properly secured.	PF	-----	-----	

¹ If not already clearly identified by name and data on the case, such pertinent information will be attached by means of a nameplate or may be painted on with aircraft enamel. (Specification 3-98.)

² Ethylene glycol is drained, strained, and returned to the engine.

³ For ground temperature above minus 16° C. (3° F.) the solution should be 30 percent glycol and 70 percent water. This solution has a specific gravity of 1.047 at 15° C. (60° F.). For ground temperatures below minus 16° C. (3° F.), the solution should be 65 percent glycol and 35 percent water. This solution has a specific gravity of 1.085 at 15° C. (60° F.).

⁴ These holes are to drain any coolant that may leak past the cylinder liner lower coolant seals.

⁵ Ethylene glycol, white band on each side of black band. Water, white.

⁶ Never insert new pellet of packing until adjustment screw is tightened to last thread. Put oil on new pellet before inserting, to avoid its jamming before it is all the way in the chamber.

115. Cooling system (air) (column 25).—a. References.—TM 1-405 and basic Technical Manual on aircraft involved.

b. Inspection requirements.

	Period			
	D	25	50	Others
(1) Check entire control assembly of engine cowl flaps, including joints, for excessive wear and proper adjustment.	-----	-----	X	
(2) Check fastening and condition of air deflectors and see that they do not rub the fins.	-----	-----	X	
(3) Inspect cylinders for damaged or broken fins.	-----	X	-----	
(4) Check cowl flaps and ring cowls for general condition and for proper operation and adjustment.	-----	X	-----	
(5) Check magneto and other cooling tubes for cleanliness, breaks, cracks, and security of attachment.	-----	X	-----	
(6) See that cowling is not rubbing cylinder fins.	X	-----	-----	
(7) See that cowling is properly fastened.	PF	-----	-----	

116. Valves (column 26).—a. References.—TM 1-405; TO 02-1-6 and 06-10-2; also basic Technical Order on engine involved.

b. Inspection requirements.

	Period			
	D	25	50	Others
(1) ¹ Lubricate upper rocker boxes on engines having automatic valve lubrication with grade 120 engine oil.	-----	-----	-----	Prior to initial operation.
(2) ² Inspect and adjust valves on engines having automatic valve lubrication.	-----	-----	-----	300 hours.
(3) ³ Inspect and adjust valves on all engines having automatic valve lubrication other than those above.	-----	-----	-----	200 hours.
(4) ⁴ Inspect and adjust valves on V-1710 series.	-----	-----	X	
(5) ⁵ Inspect and adjust valves on engines without automatic valve lubrication.	-----	-----	X	
(6) Check push-rod hose clamps and taper-guide nuts for tightness.	-----	-----	X	
(7) ⁶ Lubricate rocker-arm bearings on air-cooled engines.	-----	-----	-----	10 hours.

¹ On all other engines, refer to TO 02-10-2.

² On all radial engines from R-670 to R-1340-AN-1, V-1570 series, R-1690-23 and subsequent models, R-1820-25-34 and later models, R-1830-13 and subsequent models except R-680-9-13 installed on O-49 airplanes and R-1830-45. See Inspection (3) for others.

³ On R-680-9-13 engines installed on O-49 airplanes, V-1650-1, R-1690-21, R-1820-17-33, R-1830-45, R-2180-7-9, R-2600 series, and R-3350.

⁴ On V-1710 series engines except those having sodium filled intake valves which will be adjusted at 100 and 200 hours.

⁵ First 25 hours after installation, also. The R-440-1-3, R-540-1, R-680-3-5, and R-785-A-B-9 affected.

⁶ Refer to TO 06-10-2. For engines with oiltight rocker boxes, lubricate with grade 3000 Oil Specification 2-88 when valves are open and engine is hot. On other engines, refer to basic Technical Order.

117. Engine controls (column 20).—a. References.—TM 1-408; TO 01-1-80, 01-1-57, and 01-1-26; also basic Technical Order on aircraft involved.

b. Inspection requirements.

	Period			
	D	25	50	Others
(1) ¹ Inspect control assemblies including all rods, cables, linkage supporting brackets, guides, pulleys, etc., for free and full movement; lost motion; bent rods; frayed cables; loose, broken, or misaligned pulleys; loose or missing bolts; and for proper safetying. Adjust if necessary.	-----	X	---	
(2) ² Lubricate throttle shafts and bearings with light oil.	-----	X	---	
(3) ³ Check for proper operation and general condition of engine control assemblies.	X	---	---	
(4) ⁴ Lubricate the firewall guides with grease.	-----	---	X	
(5) ⁵ Operate supercharger and propeller controls.	AF	---	---	

¹ Clean and lubricate all moving connections and bell cranks with oil, grade 77, Specification No. 2-91. Do not lubricate sealed bearings. Adjust all levers to prevent creeping.

² Do not wash out or lubricate sealed bearings.

³ The controls to be inspected are throttle, shutters, carburetor air heater, supercharger, mixture, and propeller controls.

⁴ See applicable Technical Order for specification of grease.

⁵ Operate controls through several cycles while operating oil-dilution system.

118. Engines in general (column 29).—a. References.—TM 1-405; TO 00-25-4, 02-1-1, 02-1-40, 02-1-7, 02-1-22, 02-1-29, 02-1-55, 02-1-70, 02-1-34, 02-1-29B, 02-5A-5, and 02-35H-11; also basic Technical Order on engine involved.

b. Inspection requirements.

	Period			
	D	25	50	Others
(1) ¹ Engine change	-----	---	---	See note.
(2) ² Inoperative engines will be treated on seventh day.	-----	---	---	See note.
(3) ³ Lubricate dynamic engine mount	-----	---	---	See note.
(4) ⁴ Check rocker-box stud nuts for tightness.	-----	---	---	100 hours.
(5) ⁵ Inspect thrust-bearing nuts for tightness.	-----	---	---	See note.

¹ Replaced engines are prepared for storage and shipment. Newly installed engines are pre-oiled according to TO 02-1-4.

² See TO 02-1-1 for specific instructions.

³ At engine change or after cleaning engine. Use grease Specification 3581. See Technical Order on airplane.

⁴ Tighten to oil seal only.

⁵ Check on all engines except experimental and service test engines. O-170, R-265, R-440, R-540, V-1650 engines will be checked at first 25-hour inspection after installation. Further tightening will be performed at the discretion of the engineering officer or when nuts are found loose.

	Period			
	D	25	50	Others
(6) ⁶ Check compression on all cylinders-----	-----	-----	-----	100 hours.
(7) Check tightness of cylinder hold-down nuts on air-cooled engines.-----	-----	-----	-----	100 hours.
(8) ⁷ Inspect crankcase breather screen for cleanliness.-----	-----	-----	-----	See note.
(9) Inspect engine for missing nuts, bolts, or studs, and proper safetying; also, for cracks, broken parts, and oil leakage.-----	-----	-----	X	
(10) ⁸ Lubricate center bearing, extension shaft.-----	-----	-----	X	
(11) Inspect for oil leakage at end of crank- shaft.-----	-----	-----	X	
(12) ⁹ Inspect cylinder hold-down and cool- ant jacket stud nuts for looseness on liquid- cooled engines.-----	-----	X	-----	
(13) ¹⁰ Check for broken impeller pinion locks.-----	-----	X	-----	
(14) ¹¹ Short storage treatment.-----	-----	-----	-----	See note.
(15) ¹² Turn propeller by hand four or five revolutions before starting engines which have been idle for 2 hours or more. (IM- PORTANT.)-----	PF	-----	-----	
(16) ¹³ Ground operation.-----	PF	-----	-----	
(17) Inspect for evidence of engine throw- ing oil.-----	X	-----	-----	

⁶ Where applicable and at first 50-hour inspection after installation. On R-755-9 50-hour inspection.

⁷ R-1820 series engines, first 50-hour and 200-hour inspection. R-2600 check on 100-hour inspection.

⁸ Use approximately 25 shots of zerk gun. Use grease, H. M. P., Specification 3560.

⁹ Wherever outside nuts are found loose or there is evidence of Prestone leaks, carburetor will be removed and inside nuts tightened. At the end of first 5 hours' flying time, the cylinder hold-down nuts of V-1710-21 and associated models will be checked for tightness. No further check is necessary.

¹⁰ R-2600 series only. Refer to TO 02-35-61.

¹¹ Engines which will not be inoperative for over 7 days will be turned at least four complete revolutions by hand on alternate days. On intervening alternate days, the engine will be given a ground run-up until the oil reaches operating temperature.

¹² This operation is necessary in both summer and winter to be sure the combustion chambers are free from oil and fuel, especially on radial or inverted engines. If resistance is felt, remove the spark plugs from the lower cylinders. If fuel or oil is present, this inspection should continue toward the top until cylinders are found to be free.

¹³ Operation will be carried out in accordance with TO 02-1-29 and basic Technical Order on aircraft involved.

SECTION XI

INSPECTION OF ELECTRICAL SYSTEMS

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119. Magneto ignition system (column 22).—a. References.—TM 1-406; TO 03-5D-1, 03-5D-4, 03-5D-5, 03-5D-6, 03-5D-7, 03-5DA-2, 03-5E-1, 03-5D-8, 03-5D-9, 03-5DA-5, 03-5DA-6, 03-5DC-1, 03-5-9, 03-5-26, and 03-5-30.

b. Inspection requirements.

	Period			
	D	25	50	Others
(1) Aircraft spark plugs:				
(a) ¹ Remove plugs from engine and replace with new or reconditioned and approved type.	-----	-----	-----	100 hours.
(b) ² Check terminal connections of unshielded plugs and the elbow terminals and shielding nuts of shielded plugs for proper security.	-----	-----	-----	
(c) ³ Inspect shielded type spark plugs for loose barrels. Check and reset the gap clearances of spark plugs installed in airplanes which are operated at high altitudes.	-----	X	-----	
(2) Aircraft magnetos:				
(a) Remove breaker cover, clean breaker housing, and inspect breaker mechanism for damaged cam follower, damaged breaker felts or cushions, weak or broken breaker-arm spring (use scale for testing) proper breaker-stop clearance (lever type), worn or loose breaker-arm bushings or support pins (lever type), excessive play at breaker-arm axle, (lever type), excessive lubrication, cleanliness, security of mounting, and proper clearance between lever bushing and axle (lever type).	-----	-----	X	
(b) ⁴ Inspect and adjust breaker points.	-----	-----	X	
(c) ⁵ Lubricate magneto.	-----	-----	X	
(d) Inspect distributor for cracked head or rotor; sticking or broken brush; signs of arcing; mounting screws for tightness and cleanliness; and replace head, brush, or rotor as required.	-----	-----	X	
(3) Inspect ignition cable for condition of connections, terminals, exposed ends, and for chafing due to vibration.	-----	-----	X	
(4) Inspect ignition boosters for security of mounting and proper adjustment of engaging cable.	-----	-----	X	

¹ Before installing spark plugs, coat threads with spark-plug thread lubricant, Specification No. 3573, being careful not to coat the points. Use new gaskets when installing new or reconditioned plugs and do not tighten plugs excessively into cylinder bosses.

² When tightening spark-plug elbow terminal and shielding nuts, care will be exercised that they are tightened just sufficiently to secure a snug fit.

³ If shielded plugs are loose at the joint between the shell and core, they are removed for tightening, using special tool. After tightening, the gap clearance is carefully checked. Reset spark-plug gap clearances to 0.012 inch +0.002 inch or -0.001 inch.

⁴ Pivotless type breakers must always be adjusted so that the contacts open at the proper position of the cam in relation to the timing marks in the rim of the breaker cup and not for any fixed clearance between the contacts. The inspection period of gap clearances for all electrical equipment will vary in airplanes, depending upon the type of unit installed and the conditions under which it operates.

⁵ On pivotless breaker type magnetos, examine lubricating felt on cam follower for proper lubrication. On lever type breaker magnetos, in addition to the foregoing, lubricate bearings if oil cups are installed. Bearings in magnetos having no oil cups are packed with grease and need no lubrication between overhaul periods.

	Period			
	D	25	50	Others
(5) Ignition switches:				
(a) Inspect switch for security of mounting, condition, and security of all electrical leads and terminals.	-----	-----	X	
(b) ⁶ Test switch for proper functioning-----	PF	-----	-----	
(6) ⁷ Check operation of magneto-----	PF	-----	-----	

⁶ With the engine running at about one-third throttle, turn the ignition switch momentarily to the "Off" position. If the engine does not entirely cease firing, it is indicative of a defect in the switch or its connections, likely the ground connection. For this test, the engine must not be excessively hot and the period during which both switches are "Off" must be brief so that the engine speed does not decrease too much.

⁷ Functioning of magnetos is checked when starting and warming up the engine incident to accomplishment of the preflight inspection, and if found to be unsatisfactory, a detailed inspection is made to detect the cause.

Warning: If the engine does not cease firing when the switches are placed in the "Off" position, it will be necessary to stop the engine by turning off the fuel. After the engine stops, do not touch the propeller until the difficulty has been found and corrected, as the engine may start to "kick over" causing serious injury. Whenever running on only one magneto during engine ground check, the precautions in TO 02-1-29 will be observed.

120. Generators (column 22).—a. References.—TM 1-406; TO 03-5AA-1, 03-5AB-1, 03-5AB-3, 03-5AB-5, 03-5AD-1, 03-5AE-1, 05-1-12, 03-5AA-5, and 03-5A-7.

b. Inspection requirements.

	Period			
	D	25	50	Others
(1) ¹ Inspect generator for security of mounting, general cleanliness, proper safetying, excessive arcing.	-----	-----	X	
(2) ² Inspect generator brush assemblies for loose connections, worn or sticking brushes, and spring tension.	-----	-----	X	
(3) ³ Inspect generator commutator for rough coated, pitted, worn, or eccentric surface.	-----	-----	X	
(4) Inspect generator for condition and tightness of leads, connections, and terminals.	-----	-----	X	
(5) Check voltmeter and ammeter for discolored or chipped luminous markings and security of mounting.	-----	-----	X	
(6) Check all voltmeter and ammeter leads for security, worn places, and cleanliness.	-----	-----	X	
(7) Check for zeroing of pointers and cracked cover glass.	X	-----	-----	

¹ These inspections will also be performed at the 25-hour inspection period on the following generators: Types L-1, L-2, L-3, and M-1 and type P-1 (Models 2CM46A1 and 2CM70B1). These inspections will be performed at 10-hour intervals for the first 50 hours after installation.

² Replace brushes when worn to less than that specified in particular Technical Orders. When replacing a worn brush, the new brush must be properly seated, using No. 000 sandpaper. Sticking brush and holders should be wiped clean using a gasoline saturated rag.

³ Clean dirty or coated commutator with No. 000 sandpaper. Replace generator if commutator is found to be rough, pitted, or out of round. An eccentric commutator may be detected by holding the point of a pencil on the top of the brush with the generator operating. If pencil vibrates noticeably, commutator needs resurfacing.

	Period			
	D	25	50	Others
(8) ⁴ Inspect generator for oil leakage.-----	X	-----	-----	
(9) ⁵ Note whether voltmeter needle is steady and indicating normal voltage at cruising rpm with main line switch open.	PF	-----	-----	
(10) See that ammeter pointer zeros with main line switch "off".	PF	-----	-----	
(11) Note whether pointer is steady and indicates normal charge with main line switch "on" and the engine running at cruising rpm.	PF	-----	-----	
(12) ⁶ Inspect brushes for wear after high altitude flight.	AF	-----	-----	

⁴ If oil is noted at any inspection, remove generator and inspect oil seal for leakage. If leakage is found replace generator.

⁵ When making adjustment, line switch must be closed. Gradually increase speed, noting voltage indication on a test voltmeter.

⁶ Consult Technical Order for altitudes of airplane involved.

121. Generator control panels (column 22).—a. References.—
 TM 1-406; TO 03-5AA-3, 03-5AB-2, 03-5AB-4, 03-5AB-6, 03-5AD-2, 03-5AD-6, 03-5AE-2, 03-5AF-1, and 03-5AF-3.

b. Inspection requirements.

	Period			
	D	25	50	Others
(1) ¹ Inspect control panel contact points for condition and proper clearance.	-----	-----	-----	250 hours.
(2) ² Inspect control panel for security of mounting, general cleanliness, and proper safetying.	-----	-----	X	
(3) ³ Inspect control panel for condition of leads, connections, and terminals.	-----	-----	X	
(4) Inspect control panel flexible vibrator absorber mount.	-----	-----	X	
(5) Inspect the carbon, pile voltage regulator for mounting, condition of leads and connections, cleanliness of the unit, and the regulator setting.	-----	X	-----	

¹ If points are dirty, insert a piece of clean paper between contacts, pressing contacts together, and pulling the paper out. Be certain not to leave any lint between the contacts. Consult TO 03-5AD-2 and 03-5AD-6 for voltage-regulator models 3GBD2B4 and 3GBD2B11 and for current-control-switch relay models 3GTR72A1 and 3GTR72A1A.

² In dusty areas only. At each preflight inspection blow the contact points and dashpot free of any particles of dust or dirt.

³ On Westinghouse relay switch, magnetic chips in the relay, corroded connections, loose mounting screws, damaged parts, adequate contact pressure of connectors.

122. Landing gear retracting motors (column 22).—a. References.—TM 1-406; TO 03-5CC-1, 03-5CC-2, and 03-5CC-3.

b. Inspection requirements.

	Period			
	D	25	50	Others
(1) ¹ Check clutch for slipping torque (Eclipse).	-----	-----	-----	200 hours.
(2) Check for security of mounting, condition of housing, proper safetying, and tightness of housing bolts.	-----	-----	X	
(3) Inspect electric motor for—	-----	-----		
(a) ² Dirty or rough commutator	-----	-----	X	
(b) ³ Proper condition of brush holders	-----	-----	X	
(c) ⁴ Worn or binding brushes. Check to ascertain that they are bearing on commutator.	-----	-----	X	
(d) Loose connections	-----	-----	X	
(e) ⁵ Proper tension of brush springs	-----	-----	X	
(f) ⁶ Lubrication as required	-----	-----	-----	Motor overhaul.

¹ When checking clutch for slipping torque, remove assembly. If clutch assembly does not function properly, it should be replaced.

² If commutator needs polishing, use No. 0000 sandpaper. Remove sand particles with compressed air. If commutator is rough or badly burned, replace assembly. **Caution:** Do not use coarse sandpaper or emery cloth.

³ Binding brushes and brush holders should be cleaned with a gasoline-moistened cloth.

⁴ When worn brushes are replaced, seat brush by using No. 0000 sandpaper.

⁵ See specific Technical Order for proper tension.

⁶ Lubricant, electric motor type only 5797 every 25 hours. (TO 03-5CC-3.)

123. Starters, inertia and direct-cranking types (column 22).—a. References.—TM 1-406; TO 03-5C-1, 03-5C-2, 03-5CA-1, 03-5CA-2, 03-5CA-3, 03-5CA-5, 03-5CA-7, and 03-5C-4.

b. Inspection requirements.

	Period			
	D	25	50	Others
(1) ¹ Check solenoids for security and condition of leads.	-----	-----	X	
(2) ² Lubricate hand crank system	-----	-----	X	
(3) Inspect electric motor for—	-----	-----		
(a) ³ Dirty or rough commutator	-----	-----	X	
(b) ⁴ General condition of brush holders	-----	-----	X	
(c) ⁵ Worn or binding brushes. Check to ascertain that they are bearing on commutator.	-----	-----	X	
(d) Loose connection at brushes	-----	-----	X	

¹ When adjusting starter solenoids, have starter jaw completely retracted against baffle plate and, with oil seal and solenoid plunger in outermost position, adjust to $\frac{1}{32}$ -inch free play in cable or shaft. Defective control switches or solenoids should be replaced.

² Lubricate with oil, engine oil No. 1100.

³ If commutator is rough or badly burned, replace motor. If dirty, polish with No. 0000 sandpaper and use air to blow clean. Do not use coarse sandpaper or emery cloth. On Jack and Heintz starters, clean commutator with commutator honing kit No. 870 only.

⁴ Binding brushes and brush holders should be cleaned with a cloth dampened with gasoline.

⁵ See Technical Order for permissible brush wear. When worn brushes are replaced, seat new brushes with No. 000 sandpaper.

	Period			
	D	25	50	Others
(e) ⁶ Proper tension of brush springs.....			X	
(4) ⁷ Inspect for oil leakage. If excessive oil is found, replace starter.	X			
(5) Check for security of mounting, condition of housing, tightness of housing bolts, and safetying.	X			
(6) Inspect hand-cranking extensions, brackets, and supports for security of mounting and general condition.	X			
(7) Check for presence of hand crank.....	PF			
(8) Overhaul.....				EC.

⁶ See Technical Order on equipment involved for proper tension of brush springs.

⁷ In order to reduce starter failure caused by leakage of engine oil into and accumulated in the intermediate case of a starter and flywheel housing, drill a $\frac{3}{16}$ -inch diameter hole at the lowest point of the flywheel housing.

124. Dynamotors, alternators, and inverters (column 22).—

a. References.—TM 1-406; TO 03-5F-1, 03-5F-2, 03-5F-3, 03-5G-1, 03-5G-2, 03-5G-3, 03-5H-2, 03-5H-3, and 03-5-22.

b. Inspection requirements.

	Period			
	D	25	50	Others
(1) Inverters and auxiliary boxes:				
(a) Replace inverter vibrator element.....				500 hours.
(b) Replace lamps in auxiliary box and check for satisfactory operation.				500 hours.
(c) Check inverters for output and satisfactory operation.				250 hours.
(d) Check auxiliary box lamp and lamp starting switch for satisfactory operation.				250 hours.
(2) ¹ Remove alternator, regulator, and dynamotor for complete inspection and overhaul.				300 hours.
(3) ² Check alternator and dynamotor for—				
(a) Worn or binding brushes.....			X	
(b) Loose connections.....			X	
(c) Dirty or rough commutator.....			X	
(d) Spring tension of brushes.....			X	
(4) Remove regulator from mounting and inspect contact points for cleanliness and pitting.			X	
(5) Check all units for security of attachment.			X	
(6) Check for satisfactory operation.....	PF			

¹ Voltage-booster dynamotors models 3719, 3819, and 3820 are removed for overhaul after 1,000 hours operation.

² Be sure replacement brushes are installed with leads next to the brush boards in the same relative position as the original brush. Use No. 8-0 garnet paper to seat new brushes. See specific Technical Order for proper brush spring tension.

125. Storage batteries (column 46).—a. References.—TM 1-406; TO 01-1-1, 01-1B-1, 03-5B-1, 01-1-20, and 03-5B-1A.

b. Inspection requirements.

	Period			
	D	25	50	Others
(1) ¹ Inspect battery for leakage of acid due to cracked case or defective sealing compound.	-----	-----	-----	Weekly.
(2) ² Test each cell for specific gravity reading. Add distilled water when necessary.	-----	-----	-----	Weekly.
(3) ³ Inspect battery terminals for security, corrosion, and condition of leads.	-----	-----	-----	Weekly.
(4) Inspect for security of mounting, cleanliness, and general condition of battery container and vent system.	-----	-----	-----	Weekly.
(5) ⁴ Inspect battery vent sump (on installations so equipped).	-----	X	-----	

¹ If evidence of leakage is found, the battery will be replaced. Whenever batteries are removed, their container will be cleaned of any corrosion and, when necessary, recoated with acidproof lacquer. (Specification No. 3-168.)

² When taking a hydrometer reading, return electrolyte to cell being tested. Add only pure distilled water to limits specified. Never add electrolyte or acid to cell, and always obtain hydrometer reading before adding distilled water.

³ Corrosion may be removed by using a solution of baking soda or diluted ammonia. After removing corrosion, apply a light coat of vaseline to battery terminals, except in the case of shielded batteries on which the terminals are not exposed to battery gases.

⁴ Remove cover and inspect felt pad. If pad is covered with white flaky deposit, remove and wash in clear water, saturate with bicarbonate of soda solution, and replace. If sump body is corroded, clean and paint with acidproof paint.

126. Lights and wiring system (column 22).—a. References.—TM 1-406; TO 03-5-4, 08-5-1, 08-1-3, 08-1-4, 08-1-6, 03-5G-6, 03-5-3, and 03-5-29; also basic Technical Order on aircraft involved.

b. Inspection requirements.

	Period			
	D	25	50	Others
(1) Check landing light switches for—				
(a) Security of mounting-----			X	
(b) Cleanliness of contacts-----			X	
(2) Inspect all wiring for proper anchorage and security of union nuts, bonding, and shielding leads and terminal box covers. Check to make certain that no leads are swinging free in such a manner as to cause undue wear or fatigue.			X	
(3) Inspect all connections, terminals, exposed ends, and contacts, including ground connections for condition.			X	
(4) Inspect functioning and condition of—				
(a) Cockpit and cabin lights-----	PF	-----	-----	
(b) Lamp rheostats-----	PF	-----	-----	
(c) Landing lights-----	PF	-----	-----	
(d) Navigation lights-----	PF	-----	-----	
(e) Formation lights (when used)-----	PF	-----	-----	
(f) Passing lights-----	PF	-----	-----	
(5) Check functioning of all lights-----	PF	-----	-----	
(6) Check to see that all electrical switches are turned off.	AF	-----	-----	

SECTION XII

INSPECTION OF INDUCTION, FUEL, AND OIL SYSTEMS

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127. Oiling systems (column 24).—*a. References.*—TM 1-407; TO 05-40-10, 06-10-1, 06-10-4, 02-1-24, 02-5A-42, 03-15-3, 03-15-4, 03-15-5, 03-15-9, 03-15-14, 03-15-15, and 03-15A-1, also basic Technical Order on aircraft involved.

b. Inspection requirements.

	Period			
	D	25	50	Others
(1) Clean the oil temperature regulator.....	-----	-----	-----	EC.
(2) Clean entire oil system.....	-----	-----	-----	EC.
(3) ¹ Drain oil pressure gage line and fill with hydraulic fluid, pet. base.	-----	-----	-----	See note.
(4) ² Drain entire system.....	-----	-----	X	
(5) Inspect oil tank for security, condition of padding, leakage, proper tension of support straps, and proper anchorage of all lines.	-----	-----	X	
(6) ³ Check oil dilution control linkage for binding and for proper closing of dilution valve.	-----	-----	X	
(7) ⁴ Remove and clean all removable screens and strainers. Check for breaks and tears.	-----	-----	X	
(8) Inspect oil pressure warning switch for leaks, security of mounting, tightness of connections, and condition of electrical wiring.	-----	-----	X	
(9) ⁵ Inspect oil lines for dents, leaks, wear, and leakage at connections and for proper identification markings.	-----	X	-----	
(10) Check connections for security and proper location of clamps.	-----	X	-----	
(11) ⁶ Remove and clean the automatic or manual Cuno filter.	-----	X	-----	
(12) Check oil cooler shutters for operation.	-----	X	-----	

¹ During cold weather below 32° F., use hydraulic fluid, Specification No. AN-VV-O-386A. This procedure usually good for 60 to 90 days' operation. Repeat procedure if sluggish action is noted.

² This does not apply to systems using hopper tank except V-1710-27 and subsequent models, which are drained every 25 hours while the engine is hot. Comply with TO 02-1-22 before starting.

³ Make this inspection at first 25-hour inspection, after engine change also, and on regular 25-hour inspection for electrically operated units.

⁴ With the exception of 1535's and 1830-9-11, inclusive, which are cleaned on the 25-hour inspection.

⁵ Color code: Yellow.

⁶ Wash in gasoline and dip in clean engine oil prior to reinstallation. Cunos are cleaned in all newly installed engines after ground check, prior to flight, and after the first 5 hours of operation.

	Period			
	D	25	50	Others
(13) ⁷ Inspect oil cooler and shutters for clogged core, cleanliness, dents, leaks, proper operation, and security of mountings.	X	---	---	10 hours.
(14) Inspect entire system-----	X	---	---	
(15) Inspect drain plugs and cocks for proper safetying.	X	---	---	
(16) ⁷ Inspect blanketing of oil coolers-----	X	---	---	
(17) Check oil supply and security of cap. Enter quantities on Flight Report.	PF, AF	---	---	
(18) Check operation at the oil-pressure warning switch, if installed.	PF	---	---	
(19) Turn manual Cuno handle one revolution in a counterclockwise direction. Check the automatic Cuno for operation.	---	---	---	
(20) ⁸ Operate oil-dilution system-----	AF	---	---	

⁷ This applies only when operating under cold weather conditions.

⁸ This should be done when cold weather starting is anticipated. Extent of dilution will be governed by TO 02-1-29.

128. Fuel systems (column 23).—a. References.—TM 1-407; TO 03-10-13, 03-10-14, 03-10A-2, 03-10A-3, 03-10E-1, 03-10-15, 03-10EA-1, 03-10EA-4, 03-EA-5, 03-10EA-6, 03-10EA-7, 03-10ES-01, 03-10ED-1, 03-10-EE-1, 03-10EB-2, 03-10EC-2, 03-10EC-4, 03-10EF-1, and 03-10F-2, also basic Technical Order for aircraft involved.

b. Inspection requirements.

	Period			
	D	25	50	Others
(1) ¹ Inspect fuel pump and transfer-pump couplings for wear and lubrication of shaft plate.	---	---	---	200 hours.
(2) ² Lubricate fuel pump-----	---	---	---	See note.
(3) ³ Check clearance between thrust plate and cap to fuel cock (friction-release type).	---	---	---	See note.
(4) ⁴ Check fuel cock controls for backlash and drag and taper pins in fuel cock control linkage for looseness and proper safetying.	---	---	X	
(5) ⁵ Lubricate fuel pump flexible drive. Inspect drive member.	---	---	X	

¹ Also inspect and lubricate at first 50-hour inspection (TO 03-10-14).

² Pesco-type pumps, every 100 hours. Use grease, lubricating, cup, medium, Specification No. VV-G-681. Romec-type pumps, every 25 hours. Use grease, lubricating, grade B, Specification No. 3581. Fuel transfer pumps every 100 hours, lubricant similar to that used for Pesco pumps.

³ Prior to installation.

At first 50-hour inspection after installation.

Every 100 hours after first 50-hour period. Whenever binding occurs.

⁴ On fuel cocks having a friction release and a short control rod assembly with not more than one universal joint, 15° is maximum permitted free movement. Long control rod assemblies having more than one universal joint may be permitted a maximum free movement of 30°. On all other types, 10° is maximum free movement allowed.

⁵ Use grease, Specification No. 3560, grade 295. On B-18 airplanes, shafts are lubricated every 200 hours.

	Period			
	D	25	50	Others
(6) Inspect vent opening in relief valve, using proper size drill for plug gage.	-----	X	---	
(7) * Turn fuel on; build up fuel pressure with hand pump and check entire system for leaks, cracks, security of lines and fittings, and wear at mounting points. Check lines for identification markings and condition of warning-signal electrical connections.	-----	X	---	
(8) Inspect fuel drain and overflow lines for security, breaks, or stoppages.	-----	X	---	
(9) Remove and clean all removable strainers.	-----	X	---	
(10) Inspect fuel pump for security and proper safetying.	-----	X	---	
(11) Turn fuel cock on, operate hand pump, and observe fuel pressure.	X	---	---	
(12) Rotate all fuel cocks one full revolution and check for binding.	X	---	---	
(13) Drain all accessible fuel drains and strainers which have drain cocks. Make certain that all drain cocks and plugs are properly safetyed.	PF	---	---	
(14) Check operation of fuel pressure signal and adjust if necessary.	PF	---	---	
(15) Check fuel supply. Check security and condition of filler cap and gasket. Enter quantities on Flight Report.	PF, AF	---	---	
(16) Observe fuel pressure on each tank with engine operating.	PF	---	---	

* Color code: Red.

129. Fuel tanks (column 35).—a. References.—TM 1-407; TO 03-10-20, 03-10-26, 03-1-15, 03-1-15A, and 01-1-118; also basic Technical Order for airplane involved.

b. Inspection requirements.

	Period			
	D	25	50	Others
(1) ¹ Inspect corrosion-resistant cartridge drain-plug assembly.	-----	---	---	300 hours.
(2) ² Inspect self-sealing tanks for signs of corrosion.	-----	---	---	300 hours.
(3) Remove fuel access doors of self-sealing tanks and inspect for leakage at fitting and fuel-duct connections.	-----	---	X	
(4) Inspect fuel lines for proper anchorage near the cells.	-----	---	X	

¹ Check contents of drain-plug cartridges and fill, if required, with chemically pure potassium-chromate crystals.

² Use a round wooden stick of sufficient length to probe bottom of cell. If cell is soft and spongy, remove for complete check; if solid and springy, it is serviceable.

	Period			
	D	25	50	Others
(5) ³ Inspect fuel tanks for security, condition of padding, tension of supporting straps, and condition of gaskets. Check mounting brackets of a droppable tank (if installed).	-----	-----	X	
(6) Inspect release mechanism of droppable tanks for condition and functioning; alignment of pulleys, cables, and other moving parts of release mechanism.	-----	-----	X	
(7) ⁴ Drain fuel cells and refill to make check for existing capacity of fuel cells.	-----	-----	X	
(8) ⁵ Drain and resafety all accessible fuel drains and main strainers.	PF	-----	-----	
(9) Visually inspect the structure surrounding the self-sealing cells and all fittings attached to the cells, which are visible through the quick-opening access doors, for leaks.	PF	-----	-----	

³ For C-32, C-33, and C-34 airplanes, consult TO 01-40-15.

⁴ If capacity is less than 95 percent of original capacity of the cell, remove the cell and check for defects or swollen places in the lining or possibly a collapsed cell.

⁵ To be performed each time airplane is serviced with fuel.

Caution: All repairs to self-sealing cells should be made as soon as possible to prevent further swelling of lining.

130. Aircraft carburetors (column 23).—a. References.—TM 1-407; TO 03-10B-1, 03-10B-10, 03-10BA-2, 03-10BC-1, 03-10BD-1, 03-10BB-1, 03-10BC-2, and 03-10BC-7.

b. Inspection requirements.

	Period			
	D	25	50	Others
(1) ¹ Remove and invert carburetors to remove dirt and sediment.	-----	-----	-----	200 hours.
(2) Drain air chamber, fuel chambers, regulator, and control units (PD and PT carburetors).	-----	-----	X	
(3) ² Lubricate mixture-control latch mechanism (PD and PT carburetors).	-----	-----	X	
(4) Inspect parting surface for leakage.	-----	X	-----	
(5) Drain float and strainer chambers and flush carburetor.	-----	X	-----	
(6) Clean strainer.	-----	X	-----	
(7) ³ Lubricate throttle, shaft bearings, exposed economizer, and accelerating-pump operating parts.	-----	X	-----	
(8) Check carburetor attachment bolts and air-scoop nuts for tightness.	-----	X	-----	
(9) Inspect all safety wiring on carburetor.	X	-----	-----	
(10) Inspect carburetor and fuel line connections for fuel leakage.	X	-----	-----	

¹ This applies only to carburetors which have no provisions for draining while installed on the engine.

² Use grease, Specification No. VV-G-681, medium. (See TO 03-10B-10.)

³ Use machine-gun oil, Specification No. 2-27. On PO and PT carburetors, this operation is performed every 50 hours.

	Period			
	D	25,	50	Others
(11) ⁴ Inspect throttle and mixture-control connections for tightness and proper safety-ing.	X	---	---	
(12) Check operation of throttle and mixture-control rods before starting engine.	PF	---	---	
(13) Check wobble pump and engine fuel pump.	PF	---	---	
(14) Check fuel pressure gage and operation of carburetor air heater.	PF	---	---	

⁴ For inspections of Chandler-Evans carburetors see TO 03-10BB-1 and 03-10BC-2.

131. Manifolds, turbo-superchargers, and regulators (column 27.—a. References.—TM 1-407; TO 02-1-28, 03-10D-2, and 03-10DA-2.

b. Inspection requirements.

	Period			
	D	25	50	Others
(1) ¹ Remove supercharger for overhaul-----	-----	-----	---	500 hours.
(2) ² Check mechanical condition of complete supercharger system excluding pressure regulator for leaks.	-----	-----	X	
(3) ² Inspect pressure regulator for security of mounting and proper attachment for oil pressure and drain lines.	-----	-----	X	
(4) ² Check air-pressure line from engine induction system to regulator for leaks.	-----	-----	X	See note.
(5) ³ Check oil for cleanliness-----	-----	-----	X	
(6) ⁴ Lubricate supercharger-----	-----	-----	X	
(7) ⁵ Inspect exhaust system for blown gaskets, loose or broken studs, and damaged manifolds.	-----	-----	X	
(8) Check supercharger, exhaust, air-induction intercooler, and control system for security of mounting and evidence of failure.	X	-----	-----	
(9) ⁶ Inspect turbine wheel for proper clearance, end play, radial shake, and other defects.	X	-----	-----	

¹ On F-2H, F9C types. On A, B, and C types+20 percent.

² Every 25 hours on type A-3-A regulator.

³ Draw off a small amount of oil. If oil contains sediment, clean and flush lines and tank. If oil remains clean it may be used indefinitely.

⁴ Superchargers which are grease-lubricated are lubricated every 10 hours with Specification 3560 grease. Use grade 295 for summer and 375 for winter. During the daily inspection, if it is apparent that greasing is required, it will be done. Superchargers which are oil lubricated are checked for oil when the main oil supply is checked. Proper oils to be used are: extreme cold weather, Specification 3580; normal operation oil lubricating, grade 1065, Specification AN-VV-O-446; and in case of an emergency, engine oil or lighter. Drain and flush system when proper oil is available.

⁵ Tap the exhaust stacks or collector ring to loosen any scale formation and brush out the insides of stacks with a wire brush, if possible, without removing the manifold.

⁶ End play must not exceed 0.015 inch. Radial shake must not exceed 0.012 inch. Clearance between nozzle box and turbine-wheel buckets should be from 0.090 to 0.110 inch on F types. On A, B, and C types, 0.095 to 0.120 inch.

	Period			
	D	25	50	Others
(10) Inspect turbine wheel for cracks or other evidence of failure.	X	-----		See note.
(11) Check exhaust waste-gate system for free movement of controls. Apply penetrating oil to waste-gate operating parts.	X	-----		
(12) ⁷ Inspect intake system for broken studs, loose nuts; and evidence of leakage.	-----	-----		
(13) Check carburetor heater and scoops for security of attachment.	X	-----		
(14) Check manifolds for blown gaskets and security of attachment.	X	-----		
(15) ⁸ Check turbine wheel for freedom of operation.	PF	-----		
(16) Check operation of turbine wheel and supercharger regulator at run-up.	PF	-----		

⁷ Intake pipe packing nuts will be tightened at first 25-hour inspection after overhaul. No further tightening will be done. In case of leakage remove defective packing and replace.

⁸ To be checked both cold and hot. **Caution:** In case turbine wheel is inside flight hood, make sure the wheel is not rotating before putting hood inside of flight hood. Check for elongated buckets at edge of wheel.

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[A. G. 300.7 (30 Jun 43).]

BY ORDER OF THE SECRETARY OF WAR:

G. C. MARSHALL,
Chief of Staff.

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J. A. ULIO,
Major General,
The Adjutant General.

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(For explanation of symbols see FM 21-6.)

